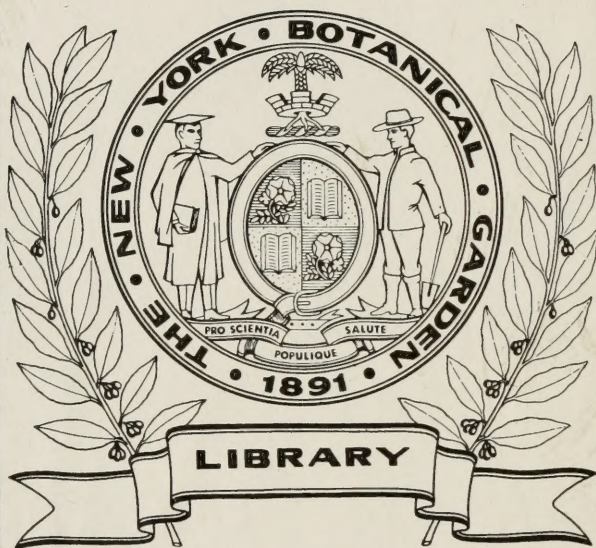


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GENERAL CROSS REFERENCES

For names of Associations, see Associations and Conventions.

For Forestry Schools, see Education in Forestry.

For names of Foreign Countries, see title Foreign Countries.

For names of States, see State Work; Private Forestry; Education in Forestry; and Forestry Associations.

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AMERICAN FORESTRY

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1910



Save Your Trees This Year —I Want to Help You!

They are the crowning majesty of the hills and the eternal glory of the vales; they greet us with no touch of reproach each new day and each new year; they stand guard over our homes and serve as trusty sentinels on the highways on which we daily pass; they forget not nor fail to keep the constant vigils for which the Creator designed them, even when wounded, neglected and abused.



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Father of Tree Surgery

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American Forestry

The Magazine of the American Forestry Association

January

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The American Forestry Association

President—CURTIS GUILD, Jr.

Former Governor of Massachusetts

The American Forestry Association was organized in 1882, and incorporated in January, 1897. It now has over 7,000 members, residents of every State in the Union, Canada, and foreign countries. From its organization it has been the tireless friend of the forests.

The object of the Association is to promote the preservation, by wise use, and the extension of the forests of the United States; its means are agitation and education; it seeks to encourage the application of forestry by private owners to forest holdings, large or small; and it favors, especially, the establishment and multiplication of National and State forests, to be administered in the highest interests of all.

The Association seeks as members all who sympathize with its object and methods, and who believe that our natural resources constitute a common heritage, to be used without abusing and administered for the common good. Seeking to conserve our supplies of wood and water, the Association appeals especially to wood-producers and users, including owners of wood lands, lumbermen, foresters, railroad men, and engineers; and to those dependent upon equable stream flow, as manufacturers, irrigators, employers of water power, and those engaged in internal commerce.

The Association meets annually in Washington. It publishes, monthly, *AMERICAN FORESTRY*, the magazine of authority in its special field. The list of contributors to this publication includes practically all persons prominent in forest work in the United States, making it alone worth the cost of Annual Membership in the Association.

The dues, covering a subscription to *AMERICAN FORESTRY*, are as follows: Annual—For Annual Members, \$2; for Sustaining Members, \$25; Total, with exemption from all other payments—for Life Members, \$100; for Patrons, \$1,000. Of the above amount \$1 is set aside each year to pay the subscription of each member to *AMERICAN FORESTRY*.

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Very truly yours,

Name _____

P. O. Address _____



Group of Chestnut Trees on Priestford Farm, Deer Creek, Harford Co., Md. These Chestnut Trees Were Grown from Nuts Planted in 1822. The Large Tree on the Left is Thirty-six Inches in Diameter

AMERICAN FORESTRY

Vol. XVI

JANUARY, 1910

No. 1

PERPETUATING THE TIMBER RESOURCES OF THE SOUTH¹

By R. S. KELLOGG, Assistant Forester, United States Forest Service

THE twelve Southern States of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia, have a forest area of more than 200,000,000 acres, nearly one-half their entire land surface. There is now standing in these forests not less than 600,000,000,000 board feet of merchantable timber, with a stumpage value of at least \$2,000,000,000.

The influence of the forest resources of the South extends far beyond its borders. North to Canada and from the Atlantic to the Great Plains, their products are in daily use. The Southern States supply nearly forty-five per cent of the lumber consumed in the entire United States. The South has a monopoly of yellow pine, that great structural timber, the cut of which alone is one-third of that of all kinds of lumber in the country. It has a monopoly of cypress and tupelo. It leads in the production of oak, of hickory, of red gum, and of cottonwood. Its hickory is the best vehicle wood ever

discovered. Its oak is in demand for the wine vats of California and of Europe. Its longleaf pine yields nine-tenths of the naval stores of the world. Twelve thousand sawmills are converting the southern forests into lumber and hundreds of other plants are turning them into veneer and staves and heading. Our railroad trains run over rails laid on scores of millions of ties cut in southern forests, and much of the freight which they haul is carried in cars made of yellow pine lumber.

The total annual value of the products of the southern forests is not less than \$450,000,000. Of this total, lumber, lath and shingles amount to \$275,000,000; posts, poles, rails, fire-wood, and cross-ties, \$125,000,000; naval stores, \$30,000,000, and cooperage stock, \$20,000,000. The average cotton crop of the South for the past ten years has been eleven and one-fourth million bales, with an average farm value of \$523,000,000, only sixteen per cent more than the value of its forest products. The average corn

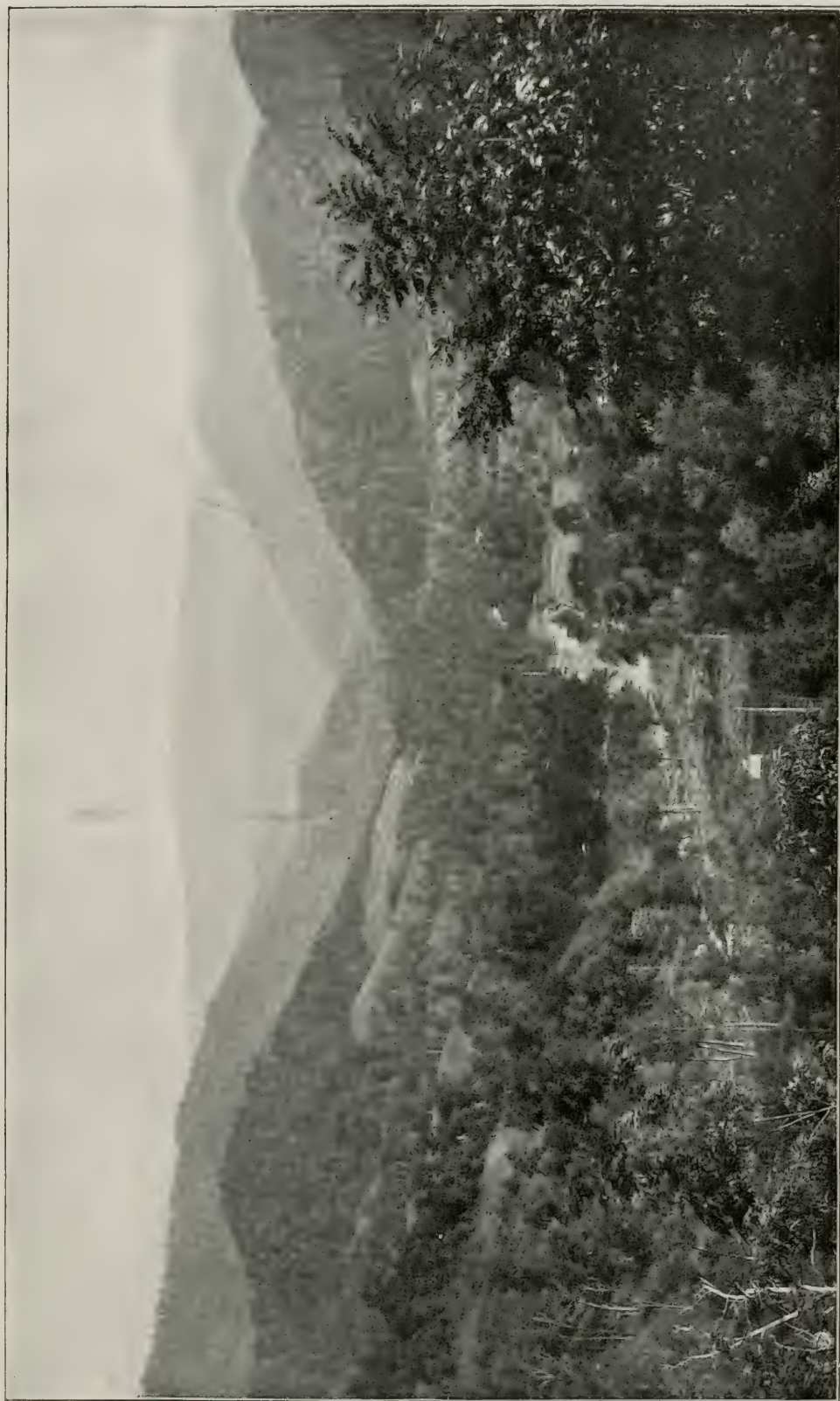
¹Abstract of speech delivered before Southern Commercial Congress, Washington, D. C., December 7.



Forest in the Southern Appalachians. Dogwood in Flower

crop during the same period has been 450,000,000 bushels, with a farm value of \$325,000,000, or less than three-fourths of the value of its forest products. Great labor, much time and money have been spent to produce these crops of cotton and of corn, which have averaged less than two-fifths of a bale

of cotton per acre, and less than seventeen bushels of corn per acre. Nothing has been done by man to produce the immense crop of forest products which he has harvested. Nature has sown and grown, he has only reaped, and generally without regard to the future of the forest.



A Southern Appalachian Mountain Scene

The forest has another great function scarcely less important than the furnishing of timber for a multitude of needs. This is its value as a soil cover. The water-power available for economic development of the streams rising in the Southern Appalachians has at an extremely conservative estimate a capitalized value of \$1,000,000,000. The protection of the forests on the water-sheds of these streams is a fundamental step in the utilization of this great resource. The conserving of the power of these streams will be a long step toward the realization of the day eagerly looked for by the South when the most of its cotton shall be manufactured at home.

So far there has been only an unrestricted exploitation of the great forests of the South. They have been cut for lumber and cooerage stock in the most wasteful fashion. They have been turpentine by methods which have left millions of acres of dead timber in their wake. From the Atlantic to the Mississippi forest fires have burned unchecked. I do not mean to imply that the South has been more wasteful of its forest heritage than have other sections of our country. All sections have been equally guilty in this. But there is this element of hope for the South which some other regions do not have. It has large areas of forest yet standing which it can conserve.

The forester is not a tree idolizer. He believes that the forests should be used. He does not believe that it is a good economic policy to maintain forests on land which would produce higher returns from other crops. He does believe that all land which is better adapted to growing trees than to any other purpose should be permanently held to the growing of timber. This is sound economy. Perhaps the 200,000,000 acres of forest which the South now has may be some day reduced to 100,000,000 acres as the demand for farm land increases, but it is undoubtedly true that this 100,000,000 acres, if brought to its highest productive capacity, will yield a greater

revenue through the growing of timber than if planted to any other crop.

Trees make little demand upon the soil. They flourish where farm crops fail. The problem, then, is to see that each kind of land grows the crop to which it is adapted, and that it produces the greatest possible yield. From its 200,000,000 acres of forests, the South is now manufacturing a product worth a little more than \$2 per acre. From 100,000,000 acres of forest it should eventually secure as great a total yield, or twice as much per acre as now. It is not good economy to devote 30,000,000 acres to the production of cotton, with an average yield of only two-fifths of a bale per acre, or 3,000,000 acres to the growing of corn, with an average yield of less than seventeen bushels per acre. Just as better methods will double the yield of these great staples, so will they double the yield of forest products.

We must have timber, consequently our forests must be maintained. The lumber industry must be made a permanent industry, harvesting the annual growth of a well-cared-for forest, and leaving a crop for next year instead of cleaning off the crop of 100 to 200 years, with no provision for the future. It is of more importance that Louisiana should cut 1,000,000,000 feet of long-leaf pine lumber twenty-five years hence than that it should cut 2,000,000,000 feet next year. It is of more importance that Florida should gather 10,000,000 gallons of turpentine in 1925 than that it should gather 20,000,000 gallons in 1910.

The conservationist is no idle theorist. He believes in use, but not in abuse. Granted that the forest must be made of the greatest possible use, but that this use must not be destructive, that we may cut the trees from year to year, but that the forest must exist forever, we come to the practical measures necessary to accomplish these ends. These are many, and by no means easy of solution.

The forests of the South are practically all in private hands. With slight



Grove of Wild Cherry (*Prunus Serotina*) in North Carolina. A Very Valuable Timber for Inside Furnishing and for Making Fine Furniture



Falls on Upper Catawba River, in Great Smoky Mountains, North Carolina (page 6)



View in Pine and White Oak "Flatwoods" after Lumbering (page 6)



Stack of Four-foot Pulpwood Logs at the Mill (page 6)

exceptions they are owned neither by the states nor the Nation. They are held by thousands of individual owners in tracts of from 100 acres to 100,000 acres each. The problem then is to see that such measures are enacted, and that such an enlightened condition of public sentiment is created, as will

bring all these forests to their highest producing capacity and make their products the most fully utilized. The whole public is concerned. The consumer must unite with the man who owns the timber in working out measures for the common good. Forest fires must be stopped, for so long as they



Effects of a Forest Fire (page 6)

are allowed to run without hindrance there will be no young trees coming on to take the place of the older ones when they are cut. State legislation must provide right fire laws and adequate means for their enforcement. Forest taxation should be so laid that its burdens do not fall unjustly upon timber. This, again, is a matter for state legislation. The states also have a duty which they cannot escape in the management of cut-over lands, which, where not suitable for farming, often are utterly unprotected and revert to the state for delinquent taxes. Such tracts should be made into state forest reserves, and other tracts of a similar character which can be purchased at nominal prices should be added to them. Properly cared for, they will become an important source of future timber supply. Along these three lines of fire protection, of right taxation, and of state forests, the states have duties which must be performed if the forest resources of the South are to be perpetuated. Needless to say, state action on these subjects should be as nearly uni-

form as differences in local conditions will permit.

Individual forest owners, and especially the owners of the larger tracts, also have duties which they cannot escape. The forests which they hold are not merely pieces of private property. They are a public trust, upon whose right administration the welfare of many depends. Unless the owners realize this, unless they do their utmost to conserve their forests while using them, public sentiment is likely to force the state governments to exercise powers of control which the states undoubtedly have, though these powers have so far lain dormant.

And, lastly, the Federal Government, too, has a duty in the maintenance of the southern forests. More than 150,000,000 acres of public forest land in the Western States, essential for the protection of watersheds and of non-agricultural value, have been proclaimed National Forests, have been made a source of permanent timber supply, and a permanent conservator of water necessary for irrigation and power. Not



Doe River Gorge, Tennessee, The Forests on the Steep Slopes of This Beautiful Gorge Are Being Rapidly Destroyed by Fire and Ax (page 6)



Pulp-wood Logs Dashing along a Waterslide (page 6)

less essential for the public welfare is the protection of the forests upon the Southern Appalachian Mountains in which head the great streams from the Ohio to the Savannah, which are of vital importance to the South for power and navigation. The interstate relations are so many that the individual states cannot be expected to protect these forests. The national government alone is equal to it. They should, therefore, be purchased and made into National Forests, to be administered

as are the National Forests of the West.

The timber resources of the South must be perpetuated—will be perpetuated. We cannot get along without them—the South cannot get along without them. Great damage has been wrought, but it is not too late to mend. Action, however, should be adequate, prompt, and vigorous. The Southern Commercial Congress, the exponent of the new South, can devote its energies to no better cause than this.



THE FORESTS OF LOUISIANA¹

By FREDERICK J. GRACE

Register of the Louisiana State Land Office and Commissioner of Forestry

LOUISIANA in the last few years has reached the second notch in the production of lumber. The great state of Washington, along the Pacific coast, precedes us. Traveling through this wooded state of ours, the train rushes by innumerable mills; or, in more leisurely journeying on some of our inland streams, such as the beautiful Teche and Bayou Plaquemine, made famous by Evangeline hunting for her lover Gabriel, one finds them lined with numerous band sawmills, heading and shingle factories, and cypress cooperage plants, cutting many million feet of lumber per day, which are fast eating up our large bodies of timber. We have still standing in this state, according to the last reports of the assessors and of the United States Forest Service, the following acreage in timber, which may be of vast importance to the lumber fraternity of this and other states: We have in pine of various kinds, as nearly as we can figure, 4,269,928 acres; and we have in hardwood, such as oak, gum, cotton, ash, maple, tupelo gum, willow, persimmon, hickory, magnolia, beech, elm, sycamore, and poplar, 3,388,486 acres; and, about as nearly as I can estimate (some parishes not reporting), I find 900,000 acres of cypress. Our denuded or cut-over pine lands amount to about 2,472,000 acres; our denuded or cut-over cypress and hardwood lands amount to about 2,000,000 acres.

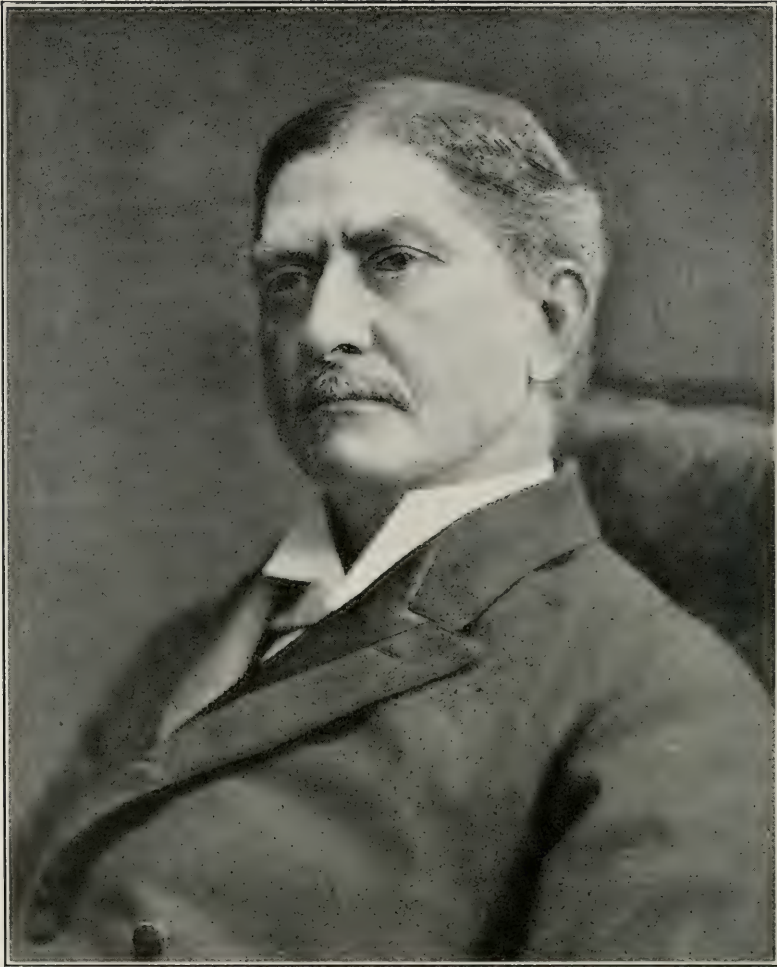
Lumber statistics and a statement issued by the Census Bureau of last June, show that in 1908 516 sawmills in Louisiana cut 2,722,421,000 feet of lumber—a decrease approximately of 250,000,000 from the cut of 1907, due principally, of course, to unfavorable

conditions. This lumber has been cut into almost every imaginable shape, employing about 35,000 men per day, and at the average price of \$2 per day would mean about \$70,000 paid out every day for labor alone. Total this for one year and it will be seen that Louisiana pays out annually a good many millions of dollars in labor alone to her vast army of employees for the lumber industry. There is no other business in the state paying out as much money for labor as the lumber mills and this is spent principally within the borders of our own state.

The principal part of the output of the lumber of Louisiana is sold in other states and foreign countries. Our pines and cypress and oak staves find their way into Europe in large quantities. Our cottonwood and other soft material is shipped all over the globe for barrel and packing purposes. A great deal of our oak and pine has been shipped into Panama to be used in the construction of the Panama Canal. According to the best information obtainable, forty-one per cent of the standing timber is still in the hands of the farmers, merchants, and other land owners, but in a good many of the large parishes in this state the larger bodies of pine and cypress timber have been purchased by the mill owners, who buy principally the timber and leave the farmer practically all the land.

The forests of Louisiana are teeming with timber of all kinds. Our pine trees are the finest grown in the world. They obtain their preeminence from a combination of qualities. They possess such qualities of strength, of elasticity combined with comparative-

¹Address delivered by Mr. Grace before the Conservation Conference of the Southern States, held in New Orleans, November 1, 1909, by invitation of Governor Sanders of Louisiana.



FORESTRY WORKERS OF LOUISIANA

Hon. Newton Crain Blanchard, of Shreveport, Governor of Louisiana, 1904-1908, an Earnest and Consistent Advocate of Forestry and Conservation of All Natural Resources

ly light weight and ease of working, as to fit them especially for the use in construction which requires the largest amount of work. They grow principally under conditions that make their exploitation easy and profitable. They are easily reproduced and are moderately quick growers, and when one pine is cut another should be planted in its place, especially short-leaf and loblolly, and as they grow on the very poorest kind of land and are of the greatest value from the standpoint of national economy, their reestablishment should

be encouraged in our different states by replanting denuded pine lands.

Our cypress, which grows principally in the southern part of the state, and in some of the low swamps of our northern parishes, is of extremely slow growth, but is the most lasting of all wood, and under water is practically indestructible. Some of the present-day giants of our cypress forests have obtained the enormous size of forty feet in circumference, and are over 3,000 years of age. This tree has always taken a unique place among our eastern



FORESTRY WORKERS OF LOUISIANA

Col. H. P. Gamble, Secretary Louisiana Conservation Commission (page 19)

forest trees, on account of its great size, peculiar habitat, and ancient lineage, for it is a representative of a type of vegetation, abundant in prehistoric times, but now only represented by the bald cypress of our Gulf states and the Mexican cypress.

The wood is believed to be the ancient gopher-wood of which the ark of Noah was built, and pieces of timber of the same wood removed from St. Peter's Cathedral in Rome to give place to brass columns were found to be in a state of perfect preservation after having been in place for more than 1,100 years. But our cypress, like our pine, is fast

disappearing, and it will be a hard matter to replace this valuable timber. We have many other valuable woods in our state, such as gum, which can be used for furniture, boxes, plow slides, barrel headings, ceiling, and other inside uses.

Cottonwood is another timber which has lately become very valuable and its lumber is almost as much sought after, in certain sections, for barrel material, box wood, and other case purposes, as the gum. At one time in Louisiana our cottonwood was practically given away by our planters to make room for cultivation, but its numerous uses here lately have made it very valuable, and



FORESTRY WORKERS OF LOUISIANA

Mrs. Angus Brown (Carrie White) Avery, of Shreveport, Secretary of the Louisiana Forestry Association and Recording Secretary of the Woman's National Rivers and Harbors Congress (page 19)

it is now worth a great deal of money: ash is also quite a factor in wood material, and we have now several large oar factories making fine oars and broom handles, and shipping them to a good many of our foreign countries. Ash is also being used for car siding and ceiling, and, when it is polished, makes a very fine finish. Our large forests of oak have also sprung into prominence here in the last few years, and oak is now being worked into cross-ties and staves, which are shipped into all foreign countries. A good deal of this heavy oak timber has found its way into

Panama, to be used in the construction of the great canal.

Staves cut from white oak of the uplands are exported through New Orleans in enormous quantities to Spain, France, Portugal, and Italy. Staves from red oak are used principally for oil, molasses and whisky barrels. They also furnish excellent spokes for wagons and carts. We have numerous other hardwoods in this state, such as elm, pecan, hickory, hackberry, and sycamore, willow, mulberry, and persimmon. These woods are usually used for fence posts, tool handles, ax handles,



J. Y. Sanders,

THE GOVERNOR OF LOUISIANA

Hon. J. Y. Sanders, Who Has Shown Himself a Friend of the New Forestry and Conservation Movement in His State (page 19)

and other uses which require a hard wood.

The osage orange, which grows a great deal in southern Louisiana, is valuable for walking canes, baseball bats, and sledgehammer handles. It makes a magnificent fence post, and in old times, was used principally as a fence

hedge between plantations. In Louisiana we have some cedar, but the recent storms have been destroying most of that.

The magnolia, the flower of which is the emblem of our state, is a beautiful evergreen tree, and, with our liveoak, grows to magnificent proportions here



FORESTRY WORKERS OF LOUISIANA

Mrs. J. D. (Alice Mai) Wilkinson of Shreveport, Chairman of the Executive Council of the Louisiana Forestry Association and Chairman of the Waterways Committee of the General Federation of Women's Clubs (page 19)

and makes a fine tree for ornamental purposes. We have in Louisiana a good deal of willow and tupelo gum, which are quick growers and should be used to a great deal of profit in the manufacture of barrel timber, case goods, and veneer work, and are, as a rule, considered quick-growing timber; and they could be used to great advantage for planting along our denuded cypress swamps and along the battures of the Mississippi River. For this purpose, I feel that they would aid in preventing caving banks and would go a long way to assist in the protection of our levees during high water, and would help the

conservation of our timber by being planted behind the levees along the river.

Another substance that grows in Louisiana forests, principally along our inland lakes and bayous, is the gray or Spanish moss, which grows on almost all the trees that are raised in this state. This moss is generally picked when the trees are being cut down for the mills, and is allowed to rot, when it becomes black and makes valuable material for the making of mattresses, cushions, and pillows, and is shipped to all parts of the United States.

Woodmen are cutting down our valuable forests, and then cutting them up and the cry now is beginning to be, "Woodman, spare that tree." It has been a hard matter to get the people of the state interested in the subject of reforestation, and it is only at meetings of this kind that we can awaken the interest of the lumber people and get them to thinking of the conservation of our forests. Our state in this respect is behind the others, but within the last year we are beginning to interest our legislators and through their means, at the last session of the legislature, we got a bill through establishing a chair of forestry at the Louisiana State University, located at Baton Rouge, and there is now a feeling that we should cooperate with the National Government and do something to assist in reforesting the denuded pine, cypress, and hardwood lands of the state.

Governor Sanders has appointed a state conservation commission of Louisiana, of which he has made Hon. Henry E. Hardtner, one of the prominent lumbermen of north Louisiana, the president; our honored young friend, Hon. Harry P. Gamble, a prominent attorney of Winn Parish, the secretary; and Hon. Robert Roberts, Jr., of Minden, treasurer. These three officers have taken a great deal of interest in or-

ganizing conservation societies in different parts of the state. We have several prominent women in north Louisiana, and no movement for upbuilding the state achieves success without the help of the women, among whom I might mention Mrs. J. D. Wilkinson and Mrs. A. B. Avery, who have been instrumental in organizing a great many of these conservation societies in different parts of the state.

On account of her numerous inland bayous and lakes which form almost a complete chain of waterways throughout the length and breadth of the entire state, it will be of incalculable value in assisting the great purpose of conservation, if our National Government will assist us in opening up the inland streams for navigation. The state, through the governor and the commissioner of forestry, has just entered into an agreement with the United States Forest Service to have one of its men come down and make an expert report on the forests of this state, which will be submitted to the next session of the legislature. The National Government has been doing this in most of the southern states, and it has given a great deal of assistance to the people at large for the valuable information contained therein about the timber interests of each state.





Cypress Growing in the Swamps (page 14)

THE CRISIS IN THE SOUTHERN FORESTS¹

By HENRY E. HARDTNER, President of the Louisiana Forestry Association
and Chairman of the Louisiana Conservation Commission

THE conservation of natural resources is a question of great importance and is engaging the attention of many of the foremost citizens of our country who are now endeavoring to formulate such plans as will be calculated to prevent the destruction of these resources.

The national forest reserves are being handled carefully and systematically according to the most up-to-date methods, and can be depended on to produce crop after crop for all ages. Not so with the forests of the South, which are chiefly in the hands of private owners, for they are handled carelessly, criminally, and with the idea of getting every possible penny out of them regardless of their future usefulness to mankind. Under existing conditions with no efforts heretofore made by the states to cooperate, we cannot say that the lumberman is any more to blame than are state and National governments. The lumberman does not wish to convert lands, now rich in natural resources which yield handsome returns to himself and the state, into barren wastes, which will not even serve as pasture. He knows much better than any one else what they are chiefly valuable for, and only awaits the opportunity to be of service to the state and Nation in conserving these resources.

Therefore, the preservation of our forests is the most important question that we have to deal with at this time, and we cannot wait years before we attempt to solve the problem. No doubt

the National Government will ere long offer substantial assistance to the states in the difficult and costly work of reforestation, but the states cannot afford to wait for assistance; they must go to work at once and handle the question honestly, intelligently, conservatively, and successfully. Louisiana should take the lead in this great movement, and while protecting her own resources, point out to others the correct course to pursue in carrying out these plans for the general good.

Louisiana has a great extent and wealth of forest, but it is rapidly and surely being depleted. Under present conditions she may continue for years to hold her present position as the second lumber producing state in the Union, but fire and the ax are reducing her producing capacity steadily, and when the present stand of mature timber is gone, Louisiana cannot remain in the front rank, unless effective steps are taken to protect and reproduce her forests.

The South, with twenty-seven per cent of the total area of the United States, contains about forty-two per cent of the total forest area of the country, and produces forty-eight per cent of all the lumber manufactured in the United States. It might be interesting to state that the lumber industry alone brings back into the South over \$10,000,000 for every working day in the year.

The forest area by states is as follows: Alabama, 20,000,000 acres; Arkansas, 24,200,000; Florida, 20,000,000; Georgia, 22,300,000; Kentucky, 10,000,000; Louisiana, 16,500,000; Maryland,

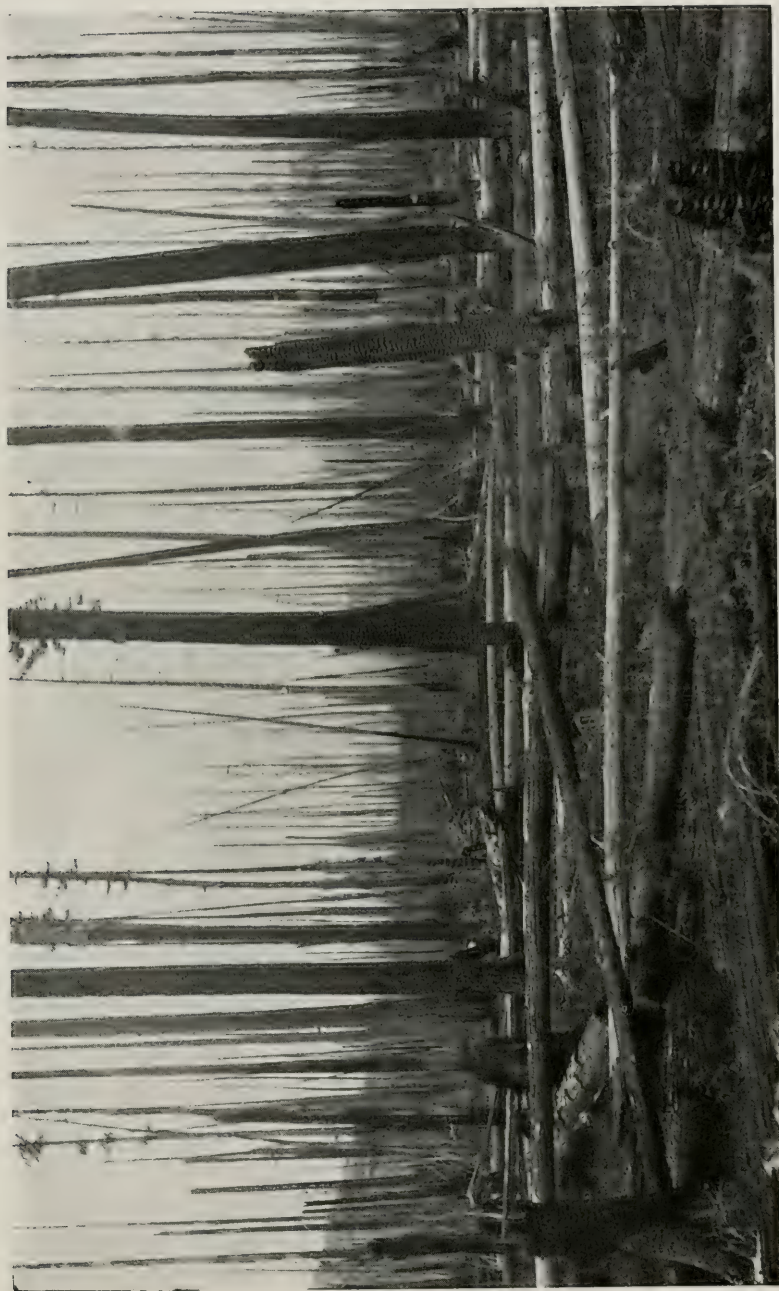
¹This article is the main body of an address delivered by Mr. Hardtner at the Conservation Conference of the Southern States held in New Orleans, November 1, 1909, by invitation of Governor Sanders of Louisiana. Mr. Hardtner is a prominent lumberman as well as an earnest advocate of forestry and conservation.



Hardwood Stand, Needing Moderate Thinning (page 24)

2,200,000; Mississippi, 17,500,000; North Carolina, 10,000,000; South Carolina, 12,000,000; Tennessee, 15,000,000; Texas, 30,000,000; Virginia, 14,000,000, and West Virginia, 9,100,000 acres. These forests should be so used that the very most may be made from the annual cut, while at the same time the cut is being replaced by new growth, thus insuring a perpetual source of wealth.

The future of the South is bound up in forest preservation with its accompanying protection to water-sheds, power streams and wood-working industries; not only in the protection of the water-sheds, which will some day furnish the power to the great majority of the manufacturing establishments but in the prosperous continuance of industries depending upon forest products.



View Showing Absolute Destruction of a Forest by Fire (page 21)

A majority of our people have had no occasion to study these matters, and, consequently, are not informed, and do not realize the dangers which threaten us. It is estimated that the timber supply of our country at the present rate of cutting cannot last longer than twenty years, and yet little has been done to avert the calamities which must follow, and which we already have to contend with. Experience is usually the best teacher, and we may in a measure avoid the disasters and perils through which other countries have passed by adopting similar measures for our protection. There is no reason why we should suffer as other nations have; from their experience we should derive wisdom and act accordingly.

While our forests have already been badly damaged, we still possess sufficient forest land to grow timber enough to meet all our needs. Our forests are one of our renewable resources, and, when rightly handled, go on producing crop after crop indefinitely, yielding safe returns on the investment. The countries of Europe and Japan know this, and their forests are daily growing more and more productive.

The countries which to-day manage their forests on sound principles have passed through four stages of forest experience. At first the forests were so abundant as to be in the way, and were neglected or destroyed. Next, as settlements sprang up and the forests receded farther and farther from the places where wood was needed, the question of local wood supplies had to be met, and the forests were protected. Third, the increasing need for wood led to the recognition of the forest as a crop like agricultural crops, which had to be planted, cared for and harvested. Finally, in order to benefit the general welfare, forests were safe-guarded and controlled so as to yield a crop year after year, and from one generation to another.

So, our country, having had the experience of other nations upon which to

predicate its plans should not have to experiment with untried theories; although in order to meet local conditions we may find it necessary to inaugurate some new methods. However, the general principles of forestry are the same the world over.¹

In this country the forests are already on the ground. All that is necessary is to bring them to a full state of productiveness. It does not take a wise man, a senator, a president, or a member of Parliament to tell you that a crisis is at hand. Go to the forests of the South, and the employees of the lumber companies will tell you that timber supplies will not last over twenty years. The surveyors, mill owners, timbermen, and speculators will tell you the same stories. Already the employees of sawmills are saving their earnings and buying a few acres of land, looking forward to the time when sawmilling will be a thing of the past, and they must provide for a home. Go to these people who are nearest nature, and they will tell you how rapidly our forests are being exhausted, and how they dread to think of the calamities of the future.

LOUISIANA OUTPUT GREATEST

Louisiana is to-day producing more lumber than any state of the Union, except Washington, and will continue to do so for many years to come, and why not for centuries? Our forests of pine, gum, cypress, oak, hickory, and other hardwoods are the most magnificent of any in the world, and it seems as if nature designed these to be protective forests owing to the fact that mighty rivers flow through our state to the Gulf, which is our southern boundary line. Forests were intended to protect us from soil erosion, cyclones, climatic changes, and hurricanes. Shall we destroy the protection that nature has given us? We are doing it, and so rapidly that inside of twenty years Louisiana will be the poorest state in the

¹Mr. Hardtner gave a brief review at this point of the forestry methods and results of Germany, France, Switzerland, Austria, Spain, China, Japan, and England, showing in this connection the influence of denudation in causing floods and erosion.



View of Ravine Showing Work of Trees in Holding Soil, from Washing (page 24)



Newly Cleared Mountain Field Planted in Corn, Rapidly Washing Away (page 24)



Excessive Erosion on Nearly Level Land, Yazoo Uplands. Gullies With Vertical Walls Eat into Cultivated Land With Remarkable Rapidity, and This May Be Prevented Only by Reforestation (page 24)

Union, unless measures are adopted to prevent these calamities.

Go to the forests of La Salle, Catahoula, Jackson, Winn, Grant, Rapides, Vernon, Sabine, Calcasieu, Bienville, Caldwell, Livingston, St. Tammany, Tangipahoa, St. Helena, and Washington parishes, where the pine forests flourished in imperial magnificence, and watch the "up-to-date" method of butchery. Virgin forests which produce from ten to twenty-five thousand feet of timber per acre are being absolutely denuded just as completely as you would strip a bird of its feathers or the beast of the field of the covering which nature provided.

Hardly a dozen saplings, the size of one's arm, to the acre are left standing, and these lands are practically deserts, a waste where soil-erosion takes place, where rains fall and the water rushes off in torrents, flooding the streams and valleys, leaving a sterile soil on the rich bottom lands, where the wind has a

clean sweep and acquires such a velocity as to scatter destruction to the towns, cities, and villages—a land reduced to poverty, which even the state could refuse to take for its taxes so far as its future usefulness is concerned. Any man who loves nature would shed tears every time he passes through our forests and sees the criminal waste that is going on.

Hardened as I am to these sights, I feel sad and depressed when I see this slaughter. What has the state done? Fought year after year to collect a pitiful taxation from these forests, sometimes reasonable and again exorbitant. No sys'em whatever, no thought of to-morrow, no idea of the worthlessness of denuded forests to any one, and no thought of dire calamities which are now upon us. What has the lumberman done? Proceeded to cut up these forests just as fast as he can, not leaving even seed to reforest his lands; running his mills night and day; pro-



Forestry in Japan: A Well-kept Forest of Timber Bamboo on Good Soil, Showing Thick Mulch of Straw and Leaves, and Open Drainage Ditch in Foreground (page 24)

ducing more lumber than the country needs, operating without profit, and leaving a desperate country behind him. Is it not time for the state of Louisiana to act? Or must we wait until we are reduced to suffering and then spend millions of dollars for measures of protection, which, if adopted now, would

solve the problem and yield to the state millions of dollars in profits?

The lumberman really has no desire to criminally destroy his forests, and I am sure that if the state would meet him half way, settle the question of taxation, and assist in the perpetuation of forests which is a benefit to all our

people, that all dangers would be averted. The lumberman knows only too well that the cutting of small timber is not profitable; that if sane cutting were used his forests would be perpetual; but he feels as if he alone cannot afford to shoulder the expense of reforestation, which is to benefit many others besides himself. He feels as if the question of taxation and protection of forests must be settled by the state before he can afford to change his methods. I believe that the lumberman would gladly assist in the enactment of laws that would solve the problem of forestry.

LOUISIANA IN THE PAST

Twenty years ago the pine, cypress, and hardwood forests of Louisiana were practically in a virgin state and unsurpassed for magnificence and wealth by any other state in the Union. Our own people did not realize the importance of these resources until foresighted men from other states, who had witnessed the destruction of their own forests, entered these lands from the states and Federal governments for a few cents per acre, and thus our own people lost golden opportunities to reap benefits from resources which were naturally their own. However, we must not lose sight of the fact that those same investors assisted materially in the upbuilding of the state, and only grasped opportunities which experience taught them were at hand, and which the Government encouraged. Railroads were built, new territories opened up, the demand for lumber increased, and Louisiana prepared to assist in supplying this demand. Dozens of saw and planing mills were erected; new towns laid out, and short-line railroads built to handle the products of the forests.

To-day Louisiana ranks second in the production of lumber of all the states in the Union, producing during the year 1907 nearly 3,000,000,000 feet, board measure; the state of Washington ranking first, with the production of nearly 4,000,000,000 feet. Fully fifty

per cent of our virgin forests have already been denuded, and the method of lumbering now used in the pine forests of our state tend to absolutely denude these lands of the smallest pine saplings, leaving the country almost a barren waste, and the lands practically worthless, which can only be reclaimed by scientific methods, and the planting of trees.

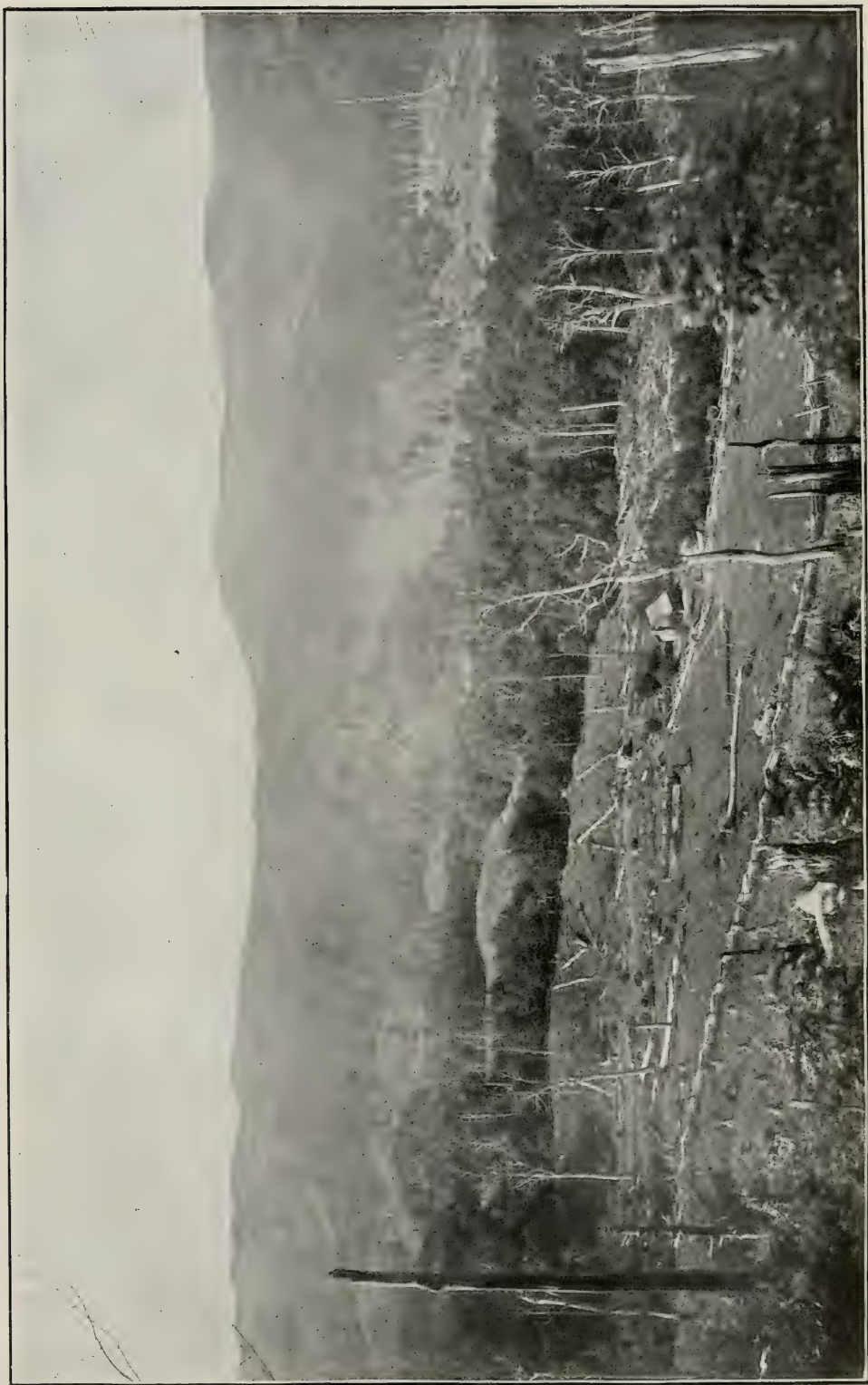
These lands must remain barren until our parochial, state, and National governments adopt a system that will tend to reforest these lands, and when this is done, fully fifty years must elapse before such areas become profitable. In the meantime, soil erosion takes place; floods become frequent and evils of various kinds overtake us. At the present rate in which we are denuding our forests they cannot last twenty years longer, and it is a fact that in ten years' time over three-fourths of our forests will have disappeared. Already, experienced lumbermen and close observers see the beginning of the end and realize the magnitude of the disasters that must surely follow—we know what has happened to Europe and Asia. Shall we adopt safe and sane measures that will protect us or must we actually witness the calamities that must surely befall us if we remain careless and indifferent before we take action?

The question that naturally arises after a person begins to realize that a crisis is approaching, and in a vague sort of way sees the dangers that confront him is—what shall we do?

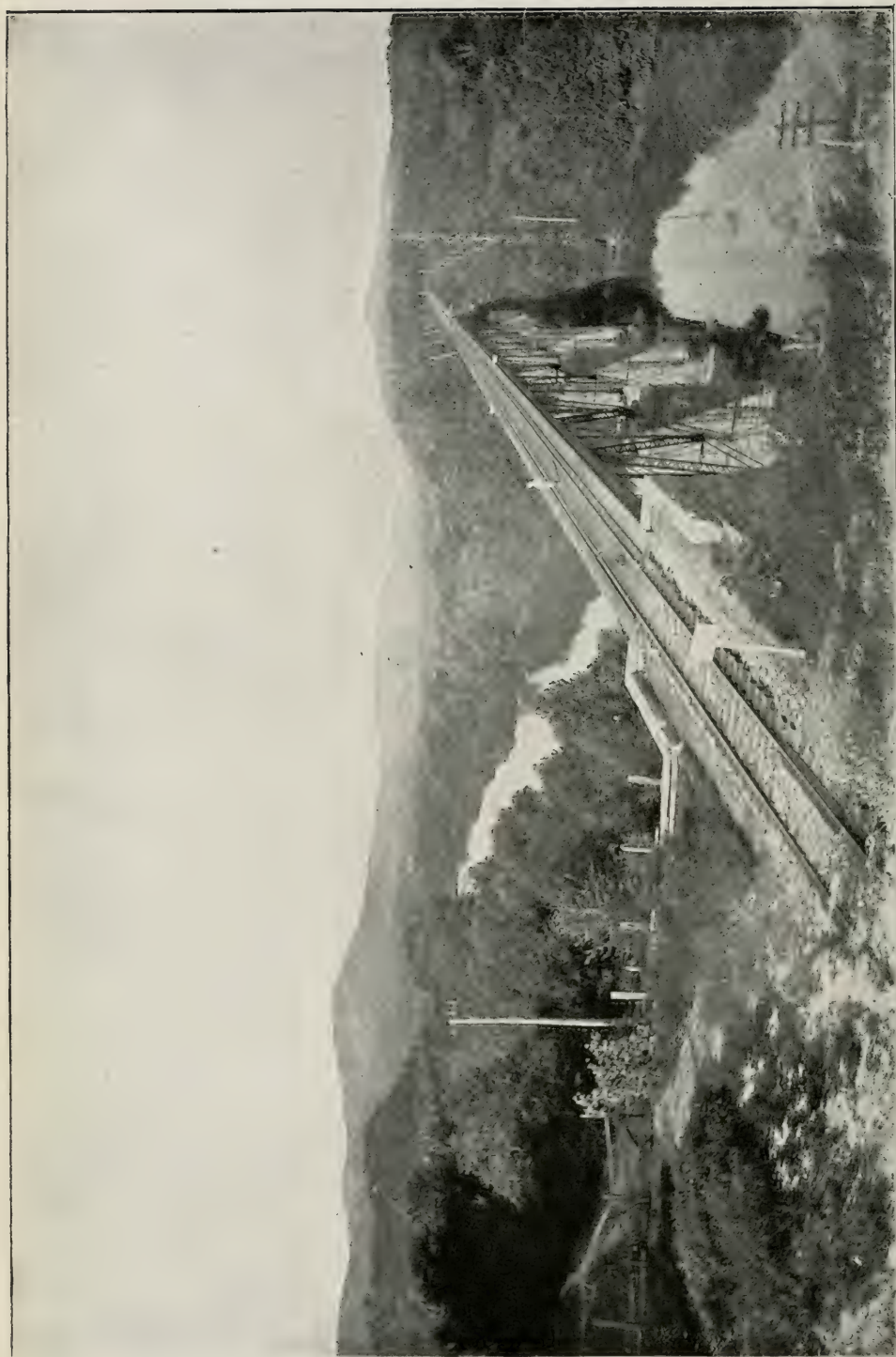
THE ANSWER

It does not take a wise man to answer quickly. Protect your remaining forests and commence at once the reforestation of your denuded areas. Enact stringent forestry laws that will protect the state and Nation.

Ex-President Roosevelt says that it is the duty of the Federal government to cooperate with the state, in order to conserve the natural resources of our whole country. Hon. Wm. J. Bryan says of this subject: "Money spent in the care of the life and health of the



Forest Destruction in the South (page 26)



The Southern End of the Appalachians, near Cartersville, Ga. (page 28)



Railroad Bridge Damaged by High Water

people, in protecting the soil from erosion and from exhaustion, in the reclamation of the deserts and swamps and in the preservation of forests still remaining, and the planting of denuded tracts is an investment yielding an annual income. If such expenditures fail to bring a return at once, the money expended is like a bequest to those who come after us. And as the parents live for their child, as well as for themselves, the good citizen provides for the future as well as the present." President Taft has pledged his support to any measure tending to conserve natural resources, and we must confidently expect that his administration will render valuable assistance in this great work.

CARDINAL GIBBONS'S OPINION

His Eminence, Cardinal Gibbons, gives his endorsement to the work by convincing arguments. He says "our forests and other natural resources are God-given heritages which belong no

more to the present generation than to the generations that are to come. It is our duty as American citizens to regard these resources as sacred trusts, to preserve them and to use them wisely and with moderation, that we may, as far as possible, provide against the days of want that are surely approaching."

The distinguished French ambassador, M. Jusserand, said: "It is an absolute principle—no forests, no waterways. Without forests regulating the distribution of waters, rainfalls are at once carried to the sea, hurried sometimes across the country. After having devastated the neighboring fields, the rivers find themselves again with little water and much sand, and with such rivers how will you fill your canals? The question is as clear as can be. Do you want to have navigable rivers, or do you prefer to have torrents destroy your crops and never bear a boat? If you prefer the first, then mind your forests * * *. If the Mississippi is the Father of Waters, the forest is the Father of the Mississippi."

THE COMMERCIAL POSSIBILITIES OF SHALLOW STREAMS¹

By JOHN L. MATHEWS

I HAVE been asked to speak to you here to-day on a topic which has been of vital interest to me for several years, and one in the solution of which I am happy to say we are now making rapid progress. You are all of you familiar with the efforts that have been made to arouse public sentiment in the matter of securing congressional aid in deepening our shallow rivers; and, more important than deepening them, in establishing definite depths in their channels and permanency in the course of the water. Deep waterways are a very necessary thing; but whenever we have gone into Congress or have taken delegates down the river to see our needs, they have asked us, "Why don't you use the channels that you have now?"; Mr. Burton and some of those who follow him having even gone to the length of suggesting that we need a law forbidding the railroads to compete with the rivers by cutting rates. I need hardly to suggest to you, gentlemen, that such a law proposed in Congress would do more harm to the deep-waterway movement, and would tend more quickly to make our campaign ridiculous in the eyes of the people, than anything else that can be done for it. We do not need any protection from the railroads on our rivers, except that in individual states we need the right of eminent domain for the use of steamboat companies to enable them to secure a foothold on the bank of the river in places where the railroad has bought every foot of land to prevent steamers tying up at the bank. This contingency, I am happy to say, is not so frequent as some government departments would give us

reason to believe, and where the situation does exist, the railroads, in most places, are now only too willing to co-operate with steamboat lines that are operated with the same sort of system and the same sane engineering development that characterizes the operation of the railroad. Every once in a while, some one, usually the secretary of the commercial association in some thriving river city, is seized with the idea of putting the rivers to use. A banquet, with rousing speeches; a subscription paper passed around, a collection of fifty or one hundred thousand dollars in pledges, the purchase of an old-fashioned, wooden-hulled, stern-wheel steamboat, and the experimental carrying of a few tons of cargo end only too quickly in the snagging of the boat, its destruction by fire, or the failure of the enterprise because of the cost of maintaining the old rattle-trap system of the days of slavery.

We are face to face with the problem of utilizing our rivers. There is no need for me here to convince you of that fact. You have heard from many great transportation experts, and among them James J. Hill, that the railways cannot carry the freight which is offered, and that their capacity to do so grows less in increasing ratio with the enormous development of our country. You have heard from Hon. John Barrett, than whom no man is better informed of our needs in South America, that only by the establishment of water transportation in our little streams can we hope to revive trade with the Latin republics. Many of you had stood, as I have stood, on the docks of the city of

¹Address delivered before the Southern Commercial Congress in Washington, D. C., December 7.

Hamburg and watched the river barges come and meet the ocean steamships there, and have realized that the German manufacturer in Magdeburg, and in the cities back of it, by this cheap water transportation lands his manufactured goods in the hold of the ocean steamship for shipment to South America for just about what it costs you to team your freight from your warehouse down to the railroad depot, or to ship it off your branch line onto the main line. It is a long jump to South America; and we will never make it until we can first stand on our own seaboard with firm feet ready for the spring.

The problem which we confront is one which we cannot solve as Germany has solved it, because in Germany hand labor is cheap, everything moves slowly, and the rivers are tiny little streams which they have managed to develop to the very highest utility. In our broad and undeveloped country it will be many decades before we can approach the evenly carpeted perfection of the banks of the Elbe, and in the time that intervenes we must make use of the facilities that we have in a manner to which our engineers must bring their attention and their best skill. For this solution we must lay down certain basic principles.

There are three counts in the cost of transportation of which we must make reckoning. The first of these is the cost from the factory door to the river landing; the second is the cost of placing the freight on the boat and taking it off the boat; and the third is the actual cost of carrying the cargo on the water. The Germans have worked out what is practically an ideal situation for factories in their great harbors of industry, in which slips from the river project into the land so that between each two slips extends a bank of land on which is a railroad track, and between the railroad track and the slip on each side is room for a factory or a row of factories. Each factory has at each side rows of freight-handling cranes, and within the building regular trolley transfer apparatus. The factory can thus receive its raw materials from up-country by rail, take them in at one

door, manufacture them, and hand them out at the other door to a barge, or it can reverse the process. Handling and teaming are entirely eliminated. It is probable that we will not come to any such ideal solution as this for a long time in our rivers. Nearly every factory, however, has a railroad switch, and we can form an alliance between the railroad and the river traffic by which freight loaded at the factory into a car and hauled over a belt-line to the river landing can be directly transferred to the boat. It is necessary, however, to install some machinery for handling the freight out of the freight car or out of the wagon into the boat. I have here the report of the Missouri Pacific Railroad, showing that in some thirty of their freighthouses, representing an investment of \$12,000,000 and as well equipped as the best railway freighthouses in America, it costs them not less than 40 cents a ton, and often 60 cents a ton, to handle what are known as "house freights"—that is, package freights in less than carload lots, out of the freight car, by a truck, into the freighthouse, and the same cost is repeated at the other end when the goods are unloaded. By the use of proper electrically-operated machinery, these costs can be greatly reduced. The actual cost of the electrical current for lifting the freight out of the hold of a vessel and swinging it over and lowering it into a car is about fifteen one-hundredths of a cent a ton. With ordinarily skilled labor and the employment of such devices as any traffic man can work out for the grouping of packages in numbers, so that two, three or four tons can be swung at a load, the whole cost, including the wages of the men employed, can be reduced to 2 cents a ton, and need, under the most unfavorable circumstances, not exceed 10 cents a ton. Terminals of this sort ought to be established by every city which has a navigable river at its doors, and they should be connected with a belt-line or with the individual railroads that operate at that town. Personally, I believe that the town itself should own all the rails in the terminal depot, as well as the machinery, and should either

lease the several docks to the operating companies or should otherwise arrange for this to be done. In cases where the towns do not build these docks, they should facilitate in every degree possible the erection and operation of these docks by the steamboat companies.

Freight cannot be carried by railroads in the main-line business in mixed trains which stop to pick up their cargo at the depot platform. How absurd it would be if the Pennsylvania Railroad should announce in the papers of the day that they would receive freight at the Union depot, and that a train would come through about four o'clock and stop there while the freight was trucked aboard; and if they should add to the announcement the fact that this train would take passengers for New York! It sounds laughable, but it is not more laughable than any one of the announcements in the papers of New Orleans, Memphis, Vicksburg, or St. Louis, or any one of a hundred other cities, every day in the year, that the magnificent new steamboat Centurion will receive freight and passengers to depart at four o'clock at the levee to-day, for Greenville and the Bends, or wherever she may be headed for.

The most important element in the development of the freight business on our waters is the absolute divorce, immediately carried out, of the freight business and the passenger traffic, and the separation into a rigid classification of the through freight business and the local business. Any one who wishes to do a little peddling business with express matter can buy a wagon and drive out among the farmers on a definite route, and every day gather in the packages they wish to send to town and every night deliver to them the things they have ordered from the city by telephone. Any one who wishes to invest ten or fifteen thousand dollars in a packet boat can do the same thing on a river, and that is all that is done to-day on the greatest number of our streams. But the real development must come in the establishment of permanent, through lines handling freights that belong to movements which influence and affect the traffic of the world.

Let me impress another thing on you, and if you will never forget it, but will shape your plans for river work upon it, you will find that you will progress toward definite achievement much more rapidly. The business of carrying freight by water is a business of great dignity and a business which must be treated in a dignified manner. Such treatment must contemplate the investment of capital on a large scale, and it must contemplate, in addition, an examination of trade routes extending from 180 degrees east to 180 degrees west of your location. There is no part of the world so remote that you may not have to receive cargo from it. There is no trade route in America so settled in its ways that you may not expect to divert some freight from it or to concentrate some tonnage upon it, and the possibility of the lowering of rates by your competitors, of the diverting of freight to new roads, all must enter into your plans. The market to which your manufacturers ship, the source of your principal supplies, and possible railroad combinations which can affect freight rates by allowing them to be carried for a short distance on your river—all is for you to consider; and you must enter into this business as you would enter into railroad building, with the definite knowledge of the kind of cargoes you are going to carry, of the kind of machinery with which you are going to handle them, and, most of all, of the kind of a box car you are going to make of your boat.

In order, then, to be of commercial value to you as shippers and manufacturers, your streams must have the three essential elements developed coordinately—the channels, the boats, and the terminals.

Concerning the channels, I wish to say a word briefly. Every river in the South has been surveyed by the engineer officers of the General Government, and some plan for its amelioration has been adopted. For twenty-five, thirty, even forty years, the engineers have struggled with these streams to carry out these projects on pitiful appropriations furnished them by Congress. No benefit will ever come to you from your

rivers developed on such a plan. In one year—in three years, at most—all of your rivers could have been completely developed for less than half of the money it will cost to develop them, had a big bond issue made the whole sum available at the outset, so that work could be carried on as any private engineer and contractor would carry it on.

Rome, now separated from the ocean by the long, swift rapids of the Coosa, would to-day be shipping and receiving over a magnificent channel, paying for its own cost yearly in its water-power, had the development of this river been undertaken on a sane and practical basis, on the same sort of a basis that would underlie the construction of a railroad to parallel it.

The Black Warrior, the Savannah—all the rivers of the South—would to-day be carrying large fleets and serving you with cheap freights, making many interior points practically seaports, if the money which is to be used were used all at once, and the repayment of it spread over as many years as necessary by bonds.

There will meet here in Washington, the day after this convention closes, the great Rivers and Harbors Congress, which demands of the Federal Congress exactly this plan: that the issue of bonds be made sufficient to take care at once of all these projects; to build your deep channels out of hand, so that the use of them may go on, and the saving they effect may help to earn the money which they cost. That will be a sane and wise investment. The money spent in the Rivers and Harbors bill is almost invariably thrown away.

Pending such action by Congress, I cannot speak too strongly in favor of another plan—that of going ahead and improving your own rivers. Many of you live in towns from 100 to 150 miles from the sea, on little rivers carrying three to five feet of water, which the Government has been patching up and patching up without effect. Nearly all of you live in states sufficiently prosperous, and in cities sufficiently rich, to have issued bonds and completed that work in any single year without feeling materially the increase in your tax

rate, and I believe that if our cities and states would go ahead and appropriate the money and dig these channels quickly, so that they get a return from them that is commensurate with the expenditure, Congress will be forced by the public sentiment of the united Nation to accept the completed work and the task of retiring the bonds. The only obstacle to river improvement in the mind of a congressman that he dares present to the public is the lack of existing traffic. Dig your rivers, make your traffic, and Congress will pay your bill.

Your channels disposed of, then, you are confronted with the problem of docks and terminals, and in that relation I refer you to two shining examples, the only two I can cite in America, and both of them southern cities. These are New Orleans and Montgomery. New Orleans, the port of the Mississippi, has prepared herself to be that port. She has not yet erected, or taken any steps toward erecting the modern terminal machinery which, according to European custom, the city itself must provide. She has left that to the individual initiative, and I am happy to say that the company which I represent proposes to spend \$200,000 during the coming year on the water-front of New Orleans erecting such machinery. But New Orleans has provided for the reception of the boats of the Mississippi, and of the ships from all lands which come to her, a public wharf, or dock, extending along the whole face of the city. For twelve miles on each bank of the river—twenty-four miles of river frontage—New Orleans owns her own shore line. On that shore line no dock may be erected without her consent. Three railway terminals stand along it, maintained by the consent of the public, but into each of these railway terminals runs the track of the public belt-line, in the favored position next to the water-front. Along her water-front New Orleans has built about four miles of completed bulkhead; some of the finest piers in America, built of creosoted timber and provided with fire-proof steel sheds for the storage of cargo. Any steamboat line, any tramp

ship, any cargo coming to New Orleans, finds a public dock and a low, fixed charge awaiting it. But this is not all. On the public dock at every point is the track of the public belt railroad, on which operate cars and engines owned by the public, and for a uniform charge of \$2 a car freight from the shipside is delivered on any railroad or to any factory which has a sidetrack in New Orleans, and for the same rate these cars are transferred from the factory to the waterside. On incoming freight this charge is absorbed by the railroads, and also on freight shipped directly from New Orleans, but whereas ten years ago the New Orleans shipper paid a car rental as high as \$15 a car to get this service done by the railway, and was forced to go to the ship himself for his bill of lading, to-day he delivers his freight to the belt-line and collects from it a bill of lading to any port in the world.

This is not the end of the New Orleans investment. Its belt-line is profitable, its docks are profitable, the city is making money, and its trade is growing; but the city will go ahead further, extending its wharves, and it will not be long before the necessities and the example of other cities will induce New Orleans to erect the terminal machinery that will make its outfit complete.

The other example which I shall cite is that of the city of Montgomery, Ala., on the Alabama River, connected with Mobile by a channel which might easily be deepened to nine feet and maintained at that depth throughout the year, but which now falls to three feet in the summer time. Even at three feet, Mobile and Montgomery should be connected by a regular service, and there has, in fact, been a packet-boat service connecting the cities, but Montgomery is situated on a high bank—eighty or ninety feet, if my memory serves me—above the river, and the situation is complicated by the fact that the river rises fifty or sixty feet in flood time. Ever since the first steamboat whistle frightened the cotton-pickers in the valley of the Alabama, steamboats and packet-boats have dumped their freight on a little patch of mud and

sand at the foot of the bank, and by a tortuous and deep-rutted road the merchants of Montgomery have dragged their freight up this hill and through the streets of the town. Irregular service, high insurance, and, above all, this charge, which was not less than \$2 a ton for local delivery, have militated against the use of the river to Montgomery, have made it an inland city with rates not to be compared with those at Mobile.

I am furnished with certain statistics of this port which will interest you by Mr. H. S. Kealhofer, the secretary of the Montgomery Chamber of Commerce, than whom no man has worked harder or more directly to the point for the reduction of freight rates and the establishment of Montgomery as a water-differential point.

Remember that Montgomery is away up in the middle of Alabama, on a direct route from Vicksburg on the Mississippi, and from Memphis, also on the Mississippi, on the Alabama River, and theoretically open to the sea. Mobile is 180 miles farther from St. Louis, and to be reached from that city by water its freight would go on a theoretical steamboat, which does not exist, from St. Louis to New Orleans, and on a theoretical coast steamboat line, which does not exist, from New Orleans to Mobile. Mobile is, therefore, on the same sort of a theoretical water channel that Montgomery is, except that it has terminal facilities and deeper water.

The rate on flour from St. Louis to Mobile is 36 cents a barrel, and until recently the rate to Montgomery was 58 cents a barrel. This is a situation very like the Spokane case, for the flour could be shipped from St. Louis to Mobile and back to Montgomery for the same rate that it could be sent direct. Montgomery, therefore, which used 225,000 barrels of flour a year, was paying practically \$50,000 more than Mobile paid for freight on the same quantity of flour. Packing-house products, of which the city used 10,000 tons a year, came from St. Louis on a 42-cent rate, against 33 cents to Mobile. The 3,000 carloads of grain prod-

ucts came on a 27-cent rate, against 16 cents to Mobile; and on the hundred cars of nails shipped from Pittsburg to Montgomery every year the city paid a rate of 45 cents, against 29 cents to Mobile, these four items alone handicapping Montgomery to the extent of \$172,900, so that Mobile was able to ship by retail into Montgomery territory for less prices than the Montgomery jobbers could wholesale in the same district.

In this state of affairs, Mr. G. Grosvenor Dawe, who was then the secretary of the Chamber of Commerce at Montgomery; the late Mr. W. F. Vandiver, a very energetic and public-spirited wholesale grocer of Montgomery, and Mr. Kealhofer began a campaign to reduce the Montgomery rates. Efforts to persuade the railroad to lower them were in vain, and when they used strenuous measures the Louisville and Nashville Railroad set up a grocery house of its own and spent thousands of dollars trying to destroy their trade. It was evident that the railroads would not help, but the river was there, and when the idea came to them that perhaps the elimination of the heavy local transfer charge on the river might help them they began a public movement for a terminal dock. That movement, I am glad to say, I helped along in some small degree. Mr. Kealhofer has carried it on his shoulders, and it has passed successfully through the stages of a public election and action by the city council, and a wharf and freight elevator which will deliver all the steamboat freight at the top of the bank is now in process of construction. This elevator, I do not hesitate to say, will take 12 cents off the cost of delivering every barrel of water-board flour in Montgomery, and it will be equally efficacious with other freights. It is only a \$10,000 investment, and when steel barges come into the Alabama River it will have to be increased to a \$50,000 investment to take care of the rapidly growing traffic. But it is a sign of the times—a public development, public terminal facilities open to all on equal terms, furnished by the public to pre-

vent railroad extortion and to make the open river a fair competitor for the rail lines.

The figures which I have given in this not only concern the actual terminal situation, but at the same time they give you a very good idea of the value of water competition in making rates. That Montgomery, even though it is a river town, should be charged 22 cents a barrel more for northern flour than Mobile is a startling confession of the ability of the railroad to haul freight at low rates when it has to, at the same time that it is a striking example of the failure of a small river to lower rates when the elements of transportation are not provided.

Rome, Atlanta, Birmingham, Jackson, Augusta, Macon, Columbia and all the other cities on the heads of the southern rivers and easily accessible to the heads of these rivers by short railway lines, are all paying these southeastern classification rates which Montgomery paid—rates which are all based on L. C. L. classifications, and are so designed as to shut the West off from the southeastern market, to shut the seaports out from the interior, and to compel these inland cities, in spite of their rivers, to trade in New York.

The same rates which shut you out from your seaport shut you out from your export trade. If you are going to manufacture goods in the endeavor to place them in South America you must reach your seaport without paying these extortionate railway charges, and when you propose to do so you are confronted with the same situation that confronted Montgomery. Your river is navigable after a fashion, and you have the opportunity to make it better, but your river is a long way from the factory, the river bank is a mudpile, the road to it is poor, your factory is on a sidetrack a mile from the wharf, and 50 cents to \$2 a ton represents the tax you would pay if you tried to use the river. Stir yourselves then; study the Montgomery movement; analyze the success of New Orleans in cutting off her local switching and transfer charges, putting herself on a par with outsiders at her own terminal docks: then when you go home

from this congress, go home with the conviction that not rivers and harbors bills, not bond issues by the Government alone will solve your problem and make your little river valuable, but this, with local cooperation and determination on the part of the city to provide the facilities for trans-shipment.

We come, then, to the third element—the boats in which you are to carry freight. The elements which are necessary here are that the boat shall run on very light draft, that it shall tow easily, that it shall be unsinkable and unburnable and, therefore, insurable at a practically negligible rate, and that it be so shaped that it shall take on and discharge its cargo with a maximum of facility and a minimum of cost. This immediately and absolutely bars from all shallow rivers the old type of wooden packet and any boat which carries upper works over the hold, or which carries engines and propelling apparatus in the same box with the cargo. For light draft it is necessary to float your engines in their own hold; that is, we must use a towboat. Then we must spread our cargo over the widest possible space in order to get good displacement. The largest barge that can navigate the channel safely and pass other boats is the barge you should build, because it will carry more tonnage on less inches. This barge should be built of steel, rectangular, with long rakes at each end, and should be divided into compartments decked over and provided with frequent weather-tight hatches, so that it will carry bulk or high-class cargoes with equal success.

I can give you some figures of boats actually designed for the Mississippi Valley Transportation Company, of which I am the secretary. These boats are to be 350 feet long, fifty feet wide, and ten feet deep in the hull, and are after the pattern which I have described. Light, they draw fifteen inches of water. On three feet they will carry 600 tons of freight; on four feet, 1,200 tons; on six feet, about 2,200 tons; on nine feet, 4,000 tons. These barges are built for the Mississippi, and are intended to load to their full draft eight months in the

year in the St. Louis trade, and on lesser draft profitably the rest of the year. Such barges will receive their cargo from overhead by the public electric cranes which you will install. They will carry on any draft you happen to have, profitably, whether it be thirty inches or six feet; heavier freights in deep water; moderate freights, but still profitable freights, in shoal water; and they will cost you \$50,000 each. Smaller barges, carrying smaller freights but still very profitably, can be built for much less. The investment in one of these barges is considerable, but the boat herself returns much more than the actual transportation cost because she saves so much in insurance and requires no maintenance for thirty or forty years but a coat of paint every winter.

The average freight rate in America is seven-tenths of a mill a ton-mile. High-class freight ordinarily pays about a cent a ton mile, and in the Southeast, two to three cents, and of this, the greater part goes to handling at the terminals and to the maintenance of right of way. River terminals can be made much more economical than railway terminals, reducing the cost of loading from 40 cents to about 6 cents a ton. Maintenance of right of way costs you nothing, and the propulsion of these long rake steel barges is so easy that on the average rivers of the South they ought to be able to carry freight for six-tenths to eight-tenths of a mill a ton mile, and at a public freight rate of 2 mills a ton mile for ordinary high-class service to make very liberal profits and immensely reduce the rail rates. We have these 2-mill, and even 1-mill freight rates now on the water, but at present they do not include insurance, nor do they include the cost of bringing the freight to the landing. The rates which we are to get in the Mississippi Valley provide for the taking of the freight from the sidetrack of the warehouse and delivering it in the warehouse at the other terminus, and they absorb the insurance and all local charges. That is what we are able to do by modern appliances.

A fleet of boats, consisting of a shallow draft towboat of 500 horsepower, drawing perhaps twenty-four inches of water, with her engines and fuel on board; and three or four steel barges of a smaller size than I have indicated, and suited for the smaller channels, but carrying 500 tons on five feet of water, so that tows of 1,500 to 2,000 tons can be propelled at a time, will cost a total of \$150,000. This is the sort of investment you have got to start with in making your rivers commercially profitable, and when you have done this your railways rates will go down from the Montgomery standard to the Mobile standard. You are able to locate your factory where fuel is cheap, where raw material is cheap, and where labor is cheap and taxes are low; and then, with this small equipment for transportation, put your outgoing freights over the shipside at the mouth of the river which serves you and send them away to South America, or through the Panama Canal to the Orient, with the assurance that they are not handicapped in this international competition by an enormous local charge in reaching the seaboard.

Finally, as to the value of shallow streams, it is perhaps necessary to emphasize this value because there has grown up a very considerable school of people, and of newspapers, who do not believe that the shoal streams are of any value whatever, and I am going to begin this statement with some very remarkable examples of the use of shallow streams.

The first of these is the River Loire, in France. About a year ago I called on the members of the firm of Oreille, who build shallow draft vessels in France, and they gave me the details of their plans for the Loire. This river is very shallow, owing to the deforestation of the Central Plateau of France, the washing down of the sand from the upper hills into the lower river. France is not very far advanced in the control of its rivers, having spent most of its time heretofore in canalizing their upper reaches and building canals parallel to the lower reaches. The Loire is an

important river, having the chief harbor of Brittany at Nantes, and forming a channel from there almost all the way to Paris, the head of that channel being at Orleans. In this reach of the river at low water there is frequently but eleven inches of water over the bars. The firm of Oreille constructed for use in this channel a fleet of barges which drew only four or five inches light, and carried eighty tons each on eleven inches of water; and a set of towboats which were built with twin screws set in tunnels amidships, so that they could be reached from overhead by removing the deck of the tunnel, and these towboats drew ten and one-half inches with their fuel on board, and pulled a fleet of five loaded barges in still water at the rate of six miles an hour, thus being able to go four miles an hour over the current pulling 400 tons of freight behind them.

This set of barges is not now in operation because the Loire had other difficulties besides its shoalness. It shifted its channel so frequently that the pilots could not keep track of it, but there was no difficulty in carrying freight on eleven inches of water. The towboat was able to do so and to compete with the railroads alongside the river.

An additional evidence of the value of shallow streams is offered by the Oder River at Breslau, in Germany. This river before improvement had less than a foot of water at low water, and since improvement its summer depth is from thirty to thirty-six inches, thirty inches being a very good navigable depth in this river. On this draft traffic continues steadily and the river handles to-day three and one-half million tons of freight a year in a channel so narrow that barges can pass only in special places.

Coming to our own country, the Mississippi Valley Transportation Company has been preparing figures and designs for the shoal streams we shall have to serve. We are going after the grain of the upper Missouri, where there is only thirty inches of water in summer, and we have many little

streams, such as the White River, the Forked Deer, and the Obion, which we will have to serve even on less water than thirty inches. See how easily this can be done. We have prepared two plans for steel boats, each of them drawn by the eminent English naval architect, Sir John Thornycroft. One of these, for the White River, is for a steel towboat which will propel about 600 tons ahead of her up that river, and a thousand to 1,200 tons, or even more, down stream. This is a little steel boat of remarkable power and efficiency, drawing only fifteen inches with her fuel on board and having 150 horsepower. For the Obion and Forked Deer we have designed by the same authority a towboat which will propel 100 to 300 tons up stream and very fair cargoes of cotton, cotton seed and other products down stream on a draft of twelve inches of water for a towboat, and this towboat has 125 horsepower. These boats are built very light and we do not care to use them any farther than necessary because we believe in putting one-fourth inch steel instead of one-eighth inch steel into our hulls when we can.

These figures give you an idea of what the towboats draw. The big barges which our company is going to use will draw fifteen inches light, and will carry freight on any depth over that. They sink one inch for every fifty tons. They are very large and too cumbersome for the little channels, but we have also designed very light, small barges carrying 100 to 200 tons for use on the twelve-inch and fifteen-inch rivers. This traffic has to be handled with the greatest care to avoid snagging and other dangers, but it requires not a very heavy investment, and when the boats are devoted to high-class traffic, as they can be, carrying manufactured goods and products which pay by rail eight to ten mills, and even 2 cents a ton mile, they can furnish a very profitable service at rates averag-

ing two and one-half to three and one-half mills a ton mile, putting first-class goods practically on a parity with railroad coal rates.

Given this sort of apparatus, prepared for your river with a view of using your streams at all stages of water, and not being subject to delay, you should have no difficulty in making your small streams of the highest commercial value, reducing the costs of freight from your cities to the sea, giving you ready service without the delays incident to rail congestion, and freeing you from the extortion which the railways have only too often practised on the interior.

And now, in conclusion, I want to say a word about this big revival of traffic on the Mississippi. We have organized there a \$10,000,000 corporation, which will in a very short time have to increase its capital to \$25,000,000. This company proposes to navigate the deep channels of the Mississippi with deep boats and the shallow channels with shallow boats. It proposes to go out from New Orleans with ocean steamers to any part of the world to which our customers wish to ship a cargo, and to maintain regular lines to the principal South American cities.

We will do more than this. We will put on coast line steamships and trains of barges for sea-towing to the mouths of all your southern streams. We shall go to Aransas, to Houston, to the Sabine, to Pensacola, to Apalachicola, to Brunswick, to Charleston, and to all the intervening ports along the coast, and wherever you have a little river, and on that little river put your steel boats and your efficient transportation and transfer apparatus, our ships and barges will come to you and collect your freight at the river mouth, and basing our traffic on the great port of the Gulf at New Orleans we will provide an economical oversea outlet for you to every port in Christendom that you may wish to ship to.



American Forestry Association

Twenty-ninth Annual Meeting

WASHINGTON, D. C.

January 18 and 19, 1910

The principal sessions will be held at the New Willard

PROGRAM

Tuesday, January 18

- 10:30 A. M.—Meeting of Board of Directors.
- 3:00 P. M.—Meeting of Advisory Board, with the President and Directors.
- 7:00 P. M.—Association dinner at the New Willard. Annual address of President Guild. Other addresses.

Wednesday, January 19

- 10:00 A. M.—Morning Session. Reports of Treasurer and Secretary. Announcement of committees. Introduction of business. Discussion: Shall the State Regulate Timber Cutting? Addresses by a governor, a lumberman, a forester, and a lawyer; followed by general discussion.
- 2:30 P. M.—Discussion: Some Aspects of the Protective Forest. Its timber value, by a forester. As a conservator of water, by an engineer. The Protective Forest in the Southern Appalachian and White Mountains. Report of Committee on Resolutions. Election of officers. Closing business.

ADJOURNMENT

8:00 P. M.—There will be an informal smoker for lumbermen and foresters, with a round-table discussion. The place will be announced at the sessions of the Association.

MEMBERS are requested to register as soon as convenient after arrival in the city. Registration prior to one o'clock on Tuesday will be at the office of the Association, 1417 G Street N. W.; after that hour at the New Willard.

DINNER tickets for the Association dinner Tuesday evening will be sold at time of registration. Members intending to attend the dinner are urgently requested to assist the committee by giving notice of their intention before Monday, January 17. Notices should be sent to the Secretary, 1417 G Street N. W., Washington. Members may bring guests with them to the dinner. The price of tickets will be five dollars (\$5.00).

A CONFERENCE of state governors is to be held in Washington on the 20th, and the governors will be invited to attend the dinner, and we hope to have some of them among the speakers.

HON. JAMES WILSON, Secretary of Agriculture, and former president of the Association, will attend the meeting and will address the Association at some time during the sessions.

HOTEL ACCOMMODATIONS: The Committee of Arrangements will gladly render any assistance in securing hotel accommodations to members from a distance who attend the meeting. Address the Secretary at as early a date as possible, giving all necessary details.

OTTO LUEBKERT,
HENRY A. PRESSEY,
CUNO H. RUDOLPH,
GEORGE P. WHITTLESEY,
EDWIN A. START, *Executive Sec.*
Committee of Arrangements.

THE WEEKS BILL

Sixty-first Congress, First Session, H. R. 11798

IN THE HOUSE OF REPRESENTATIVES

July 23, 1909

Mr. Weeks introduced the following bill; which was referred to the Committee on Agriculture and ordered to be printed

A Bill

To enable any state to cooperate with any other state or states, or with the United States, for the protection of the watersheds of navigable streams, and to appoint a commission for the acquisition of lands for the purpose of conserving the navigability of navigable rivers.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of the Congress of the United States is hereby given to each of the several states of the Union to enter into any agreement or compact, not in conflict with any law of the United States, with any other state or states for the purpose of conserving the forests and the water supply of the states entering into such agreement or compact.

SEC. 2. That the sum of \$200,000 is hereby appropriated and made available until expended, out of any moneys in the National Treasury not otherwise appropriated, to enable the Secretary of Agriculture to cooperate with any state or group of states, when requested to do so, in the protection from fire of the forested watersheds of navigable streams; and the Secretary of Agriculture is hereby authorized, and on such conditions as he deems wise, to stipulate and agree with any state or group of states to cooperate in the organization and maintenance of a system of fire protection on any private or state forest lands within such state or states and situated upon the watershed of a navigable river: *Provided*, That no such

stipulation or agreement shall be made with any state which has not provided by law for a system of forest-fire protection: *Provided further*, That in no case shall the amount expended in any state exceed in any fiscal year the amount appropriated by that state for the same purpose during the same fiscal year.

SEC. 3. That the Secretary of Agriculture, for the further protection of the watersheds of said navigable streams, may, in his discretion, and he is hereby authorized, on such conditions as he deems wise, to stipulate and agree to administer and protect for a definite term of years any private forest lands situated upon any such watershed whereon lands may be permanently reserved, held, and administered as National Forest lands; but such stipulation or agreement shall provide that the owner of such private lands shall cut and remove the timber thereon only under such rules and regulations, to be expressed in the stipulation or agreement, as will provide for the protection of the forest in the aid of navigation: *Provided*, That in no case shall the United States be liable for any damage resulting from fire or any other cause.

SEC. 4. That there is hereby appropriated, for the fiscal year ending June 30, 1910, the sum of \$1,000,000, and for each fiscal year thereafter a sum not to exceed \$2,000,000 for use in the examination, survey, and acquirement of lands located on the headwaters of navigable streams or those which are being or which may be developed for

navigable purposes: *Provided*, That the provisions of this section shall expire by limitation on the 30th day of June, 1915.

SEC. 5. That a commission, to be known as the National Forest Reservation Commission, consisting of the Secretary of War, the Secretary of the Interior, the Secretary of Agriculture, and two members of the Senate, to be selected by the President of the Senate, and two members of the House of Representatives, to be selected by the Speaker, is hereby created and authorized to consider and pass upon such lands as may be recommended for purchase as provided in section six of this act, and to fix the price or prices at which such lands may be purchased, and no purchases shall be made of any lands until such lands have been duly approved for purchase by said commission: *Provided*, That the members of the commission herein created shall serve as such only during their incumbency in their respective official positions, and any vacancy on the commission shall be filled in the manner as the original appointment.

SEC. 6. That the commission hereby appointed, shall, through its president, annually report to Congress, not later than the first Monday in December, the operations and expenditures of the commission, in detail, during the preceding fiscal year.

SEC. 7. That the Secretary of Agriculture is hereby authorized and directed to examine, locate, and recommend for purchase such lands as in his judgment may be necessary to the regulation of the flow of navigable streams, and to report to the National Forest Reservation Commission the results of such examination: *Provided*, That before any lands are purchased by the National Forest Reservation Commission said lands shall be examined by the Geological Survey and a report made to the Secretary of Agriculture, showing that the control of such lands will promote or protect the navigation of streams on whose watersheds they lie.

SEC. 8. That the Secretary of Agriculture is hereby authorized to purchase, in the name of the United States, such lands as have been approved for purchase by the National Forest Reservation Commission at the price or prices fixed by said commission: *Provided*, That no deed or other instrument of conveyance shall be accepted or approved by the Secretary of Agriculture under this act until the legislature of the state in which the land lies shall have consented to the acquisition of such land by the United States for the purpose of preserving the navigability of navigable streams.

SEC. 9. That the Secretary of Agriculture may do all things necessary to secure the safe title in the United States to the lands to be acquired under this act, but no payment shall be made for any such lands until the title shall be satisfactory to the Attorney-General and shall be vested in the United States.

SEC. 10. That such acquisition may in any case be conditioned upon the exception and reservation to the owner from whom title passes to the United States of the minerals and of the merchantable timber, or either or any part of them, within or upon such lands at the date of the conveyance, but in every case such exception and reservation and the time within which such timber shall be removed and the rules and regulations under which the cutting and removal of such timber and the mining and removal of such minerals shall be done shall be expressed in the written instrument of conveyance, and thereafter the mining, cutting, and removal of the minerals and timber so excepted and reserved shall be done only under and in obedience to the rules and regulations so expressed.

SEC. 11. That inasmuch as small areas of land chiefly valuable for agriculture may of necessity or by inadvertence be included in tracts acquired under this act, the Secretary of Agriculture may, in his discretion, and he is hereby authorized, upon application or otherwise, to examine and ascertain the location and extent of such areas as in his opinion may be occupied for

agricultural purposes without injury to the forests or to stream flow and which are not needed for public purposes, and may list and describe the same by metes and bounds, or otherwise, and offer them for sale as homesteads at their true value, to be fixed by him, to actual settlers, in tracts not exceeding eighty acres in area, under such joint rules and regulations as the Secretary of Agriculture and the Secretary of the Interior may prescribe; and in case of such sale the jurisdiction over the lands sold shall, *ipso facto*, revert to the state in which the lands sold lie. And no right, title, interest, or claim in or to any lands acquired under this act, or the waters thereon, or the products, resources, or use thereof after such lands shall have been acquired, shall be initiated or perfected, except as in this section provided.

SEC. 12. That, subject to the provisions of the last preceding section, the lands acquired under this act shall be permanently reserved, held, and administered as national forest lands under the provisions of section twenty-four of the act approved March 3, 1891 (Vol. 26 Stat. at Large, p. 1103), and acts supplemental to and amendatory thereof. And the Secretary of Agriculture may from time to time divide the lands acquired under this act into such specific National Forests and so designate the same as he may deem best for administrative purposes.

SEC. 13. That the jurisdiction, both civil and criminal, over persons upon the lands acquired under this act shall not be affected or changed by their permanent reservation and administration as National Forest lands, except so far as the punishment of offenses against the United States is concerned, the in-

tent and meaning of this section being that the state wherein such land is situated shall not, by reason of such reservation and administration, lose its jurisdiction nor the inhabitants thereof their rights and privileges as citizens or be absolved from their duties as citizens of the state.

SEC. 14. That five per centum of all moneys received during any fiscal year from each National Forest into which the lands acquired under this act may from time to time be divided shall be paid, at the end of such year, by the Secretary of the Treasury to the state in which such National Forest is situated, to be expended as the state legislature may prescribe for the benefit of the public schools and public roads of the county or counties in which such National Forest is situated: *Provided*, That when any National Forest is in more than one state or county the distributive share to each from the proceeds of such forest shall be proportional to its area therein: *Provided further*, That there shall not be paid to any state for any county an amount equal to more than forty per centum of the total income of such county from all other sources.

SEC. 15. That a sum sufficient to pay the necessary expenses of the commission and its members, not to exceed an annual expenditure of \$25,000, is hereby appropriated out of any money in the Treasury not otherwise appropriated. Said appropriation shall be immediately available, and shall be paid out on the audit and order of the president of the said commission, which audit and order shall be conclusive and binding upon all departments as to the correctness of the accounts of said commission.

MAJESTIC WOODS

Majestic woods of ev'ry vigorous green,
Stage above stage, high waving o'er the hills,
Or to the far horizon wide diffused,
A boundless, deep immensity of shade.

—Thomson

EDITORIAL

American Forestry

OUR magazine opens its new volume under a name clear cut and definite, and we believe more descriptive of its primary mission than that of *Conservation*, which has appeared upon its cover for a little over a year. The change has not been made without careful deliberation on the part of the directors of the Association, and consultation with the advisory board, and with those whose knowledge of the history of the Association entitles them to judge of its wisdom. Changes of name of a publication are not to be lightly made, and ours has suffered somewhat in this respect. Since the development of the great movement for the conservation of all our natural resources was set on foot there has been a little confusion as to the function of different agencies for the promotion of this work, but we believe that a very large majority of the members of the American Forestry Association, whose magazine this is, will agree that their directors have well and conscientiously fulfilled their trust in defining the especial task of the Association and of its magazine as the intensive cultivation of the field of forestry. This will not be interpreted narrowly, but in its broadest sense, as it affects the life and welfare of the American people, through the maintenance of a supply of forest products, the protection of the land and stream-flow, and the maintenance of healthful climatic conditions. This is a far-reaching subject, and AMERICAN FORESTRY is the only magazine in this country that undertakes its interpretation to our people.

How we propose to accomplish this task is set forth in other pages of this issue. We ask for the cooperation of

our members and of all of the forestry workers of the country in making our efforts a success.

The new name does not, therefore, mean a new magazine, nor a break in our growth. It means a clarifying of our ideas as to our function in the progressive movement now going on and continuance of the improvement in our product which we have always tried to make from year to year.

It does not mean narrowing our policy, but intensifying it and directing it more effectively.

It does not mean an abandonment of the broad platform of conservation. It means that the movement has already grown to the point where special work is needed along special lines, and of these, forestry, for its primary value and its secondary effects, is the most important and still calls for thorough educational work and effort along legislative and practical lines. This is what the American Forestry Association was organized for over twenty years ago, and what we believe its large membership wish it to do. This we hope to do with the help of the national and state forest services, and of kindred associations in all parts of the United States. AMERICAN FORESTRY aims to work with and for them all.



A Greater Union Through a Greater South

IN SETTING up for its guiding principle "a greater Union through a greater South," the Southern Commercial Congress has struck a note of combined local pride and national patriotism which should find response from every Southerner and fraternal sympathy from every Northerner and

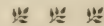
Westerner. The young men of the South are indeed seeing visions and incorporating them into realities in a new and wonderful development of a wonderful country. And still only the surface of its possibilities has been scratched. The southern states have untold wealth of natural resources, coal and iron and other minerals and metals, rivers for power and navigation, forests which are to-day the chief source of our supply of timber, soil and climate suited for a rich and varied agriculture. The development of these resources will indeed mean a greater Union as well as a greater South. Hence every good American should watch with approval and encouragement the splendid work of the Congress and hope for its fulfillment on the broadest lines that its promoters can conceive.

This means conservation in the fullest sense of that but half-understood word—not exploitation, not waste, not a mere selling of the people's heritage to boom business for the moment at the expense of the next generation. We have perhaps learned our lesson in that respect, partially at least, and the able gentlemen who are making their new organization so successful have their minds clear on this point. Therefore, we look to them for such a support of the forestry movement in the South as it has not yet had in that section. Of all branches of conservation work none is so fundamentally important to all of the southern states. When oil and gas and metals and minerals are exhausted, if the forests in the mountains are cared for they will still be yielding wealth in steady crops from year to year. More than that, however, the countless rivers that they guard and nourish will flow steadily on generating power and providing cheap highways for commerce—the people's highways—and watering and draining the agricultural lands. Here is the real wealth of nations, continuous and inestimable, and the South is richly endowed with it.

Every southern state should take up the forestry problem within its own borders. When the ultimate effect of the forests is considered, nothing is

more vital in all their state problems. What is necessary can be done in large measure by the states, but there is one element in the problem which involves so many states and is so large in its scope that it calls for national action. To those who have read this magazine in the past we hardly need to say that we refer to the reservation and protection of the great central water-shed of the Southern Appalachians, with the condition of which every southern state east of the Mississippi is concerned. This and the White Mountain region of New England are the two great national forest problems of the East. In the last number of this magazine Mr. John H. Finney, secretary of the Appalachian National Forest Association, pressed home the importance of this question to the South, and showed how many of the southern congressmen have failed to recognize the needs of their section and of the Nation in their action upon it. The extent of river navigation which is dependent upon these mountain forests has been recognized as giving the Nation a clear right to act, even if the general welfare were not broad enough and insistent enough to give such a right, and every one knows that the general-welfare clause has always been successfully invoked in the face of urgent public need like this.

The Southern Commercial Congress can be a power in securing action in this regard, and in no way can it better demonstrate the close connection between a greater South and a greater Union.



Inaugurating State Forests in the South

AT THE recent Southern Commercial Congress in Washington Mr. John H. Finney, secretary of the Appalachian National Forest Association, made a pregnant suggestion.

He called attention to the state's two-fold duty toward the forests, namely: first, that of conserving them itself; second, that of aiding the individual in so doing.

That it may adequately perform its function toward forests, the state must maintain forests.

Some states acquire forests by purchase. In the South, however, this is impracticable, partly because of inadequate state revenues and partly because of the slight return which the state would secure from such forests as it could purchase.

How, then, may a system of state forests be inaugurated in the South?

Mr. Finney pointed out that, scattered over the South, are considerable forest areas in private ownership, largely or wholly held out of use.

Some of these belong to private estates, some to water-power companies, some to municipalities holding them as watershed protectors, some to public utility corporations, and still others to railways.

Such forests, he declared, if under state control and conservatively handled would yield an income more than sufficient to offset the cost of their management.

But if the state cannot buy them, how can they come under state control?

Mr. Finney's proposal is that the owner of such a forest tract either give it outright or loan it to the state for a term of years.

Lands loaned the state for a considerable time, as fifty years, could be offered under definite conditions, including the following:

First, the tract should be known as a "state forest;"

Second, it should be placed in charge of a state forester, and handled in accordance with forestry principles;

Third, taxes should be remitted throughout the period of the loan;

Fourth, the tract should be carefully protected by the state against fire;

Fifth, the returns from the forest during the loan period should go to the state.

This plan should, in many instances, commend itself to the forest owner: under it, he escapes taxation on his forest land during the loan period, and, at the end of that period, receives back his tract in better condition than before.

The forests will cost the state nothing, save the expense of maintenance, which should be met from the proceeds of the forest itself.

Meanwhile, the public will have gained through the demonstration of the practicability and profitableness of state forests administration.

To secure the best results, a considerable area should be offered at the outset. The income from 20,000 acres of fair forest land would, in Mr. Finney's judgment, suffice to maintain a state bureau of forestry with an income of probably \$10,000 per annum. With the growth of the area would come a growth in income and in the efficiency of the forest bureau.

These 20,000 acres need not lie in a single body. Smaller areas scattered throughout the state while more expensive for maintenance would be correspondingly more valuable for demonstration purposes, as the effects of state administration would be witnessed by a far larger body of citizens.

Whether the proffer of such an area would be accepted by the state is not, in Mr. Finney's judgment, a question for debate. Public sentiment would demand its acceptance and the enactment of necessary legislation to provide for its administration.

That the plan may succeed it is necessary, apparently, that only a single donor of sufficient breadth of view and public spirit shall be found to make the initial offer. The offer will be accepted, other offers will follow, the area will grow, the bureau will grow, the wisdom of the plan will promptly become manifest and similar state forests will quickly spread throughout the entire limits of the Southland, to the infinite advantage of that great and growing section.

Can the man be found large enough to grasp the opportunity, and, as a benefactor to the South, out rival Mr. Carnegie with his libraries, or Mr. Rockefeller with his anti-hookworm fund?

National Forests as a Business Proposition

AS IS generally known, twenty-five per cent of the receipts from the National Forests in each state are returned annually to that state for roads and schools. For the year ending June 30, 1908, the amount of these receipts was \$1,788,255.19. As a part of the annual budget of a National Forest state, its share of this sum is a helpful item.

Speaking of this, the *Denver Times* declares sarcastically, "Several of the western states are jubilant over their returns from the Pinchot preserves within their borders.

"They seem to think that every dollar returned to them was a dollar gained, when, in point of fact, they paid four dollars to get one; and, on top of their four dollars the National Government was compelled to pay five dollars. So it cost the Federal Treasury and the state industry nine dollars to get one dollar for local roads and schools."

This astounding statement is explained as follows: "The appropriations by Congress for the Pinchot bureau for the year ending June 30, 1908, were \$3,759,086.46. During the same period the net receipts from timber sales, penalties, grazing fees and uses were \$1,788,255.19. Of this latter amount, paid by the people of the state, there was returned to the several states one-quarter. Thus it cost individual citizens \$1,341,192.45 more than was paid back to their state; and it cost the National Treasury—of the people's money—an additional amount of \$1,970,831.27. * * * It cost the people nearly \$4,000,000 to collect \$1,788,000 from themselves."

In closing, the writer refers to "persons who think the people can enrich themselves by paying a Federal bureau to collect nine dollars from the public in order to have one dollar returned to schools and roads."

This editorial is typical of the matter which, from day to day, is served up to its readers by the school which lays it down as an article of faith that "it is a crime to perpetuate the public do-

main," and "urges the fullest possible liberality on the part of the Government in passing the lands and their resources into the hands of *bona fide* citizens."

To this school, the idea that the public domain is "a national heritage to be handed down" to the people, is odious, the national administration of a national estate is constantly proclaimed as "feudalism," "bureaucracy," the conversion of a free people into a "tenantry," and the like; and to its mill, whatever will discredit the National Forest Service is grist.

This fact should be grasped and never forgotten; otherwise, the incessant warfare upon Mr. Pinchot and his work cannot be understood.

Let the position of the above editorial be analyzed. The receipts from the National Forests last year equaled almost forty-eight per cent of the national appropriation for the Forest Service, and of these receipts, the National Forest states received twenty-five per cent. Thus, "it cost the Federal Treasury and the state industries nine dollars to get one dollar for local roads and schools."

The assumption evidently is that because the National Forests in 1908 returned in cash about half what Congress appropriated for the United States Forest Service, the American people get out of that Service but one dollar where they put in nine.

Suppose the Forest Service collected more money from the National Forests, as, for example, by selling more timber, it might easily do, what then? One of the constant grounds of attack by these critics is that the Forest Service charges for the use of the natural resources in its charge. Hence the greater the receipts of the Service, the greater the offense committed by "Baron Pinchot."

These criticisms suggest the familiar alternative of a decadent theology under the terms of which you are "d—d if you do, and d—d if you don't."

If the Forest Service charges for the use of the natural resources it is reducing the people to vassalage; if it fails to charge enough to cover its entire congressional appropriation it is wast-

ing the people's money at the rate of nine dollars for one.

Examine the subject from another angle. One of the constant demands of the critics in question is that the public domain shall be "developed." A large percentage of the annual expenditures of the Forest Service goes to the building of roads, the putting in of telephone lines, the establishment of nurseries for reforestation purposes, and the like. All this, of course, is "development," pure and simple. Yet the Forest Service gets no credit for it. Instead, public money spent for this purpose, we are expected to infer, is thrown away.

As to the expensiveness of the Forest Service, let some other facts be noted: our National Forest fire loss amounts annually to about \$50,000,000, a sum greater than the Harriman estate, and more than thirteen times the appropriation made to the Forest Service for 1908.

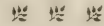
Yet the Forest Service is showing the country how to prevent forest fires, and has reduced fire damage on the National Forests to a figure which, compared with the damage to our non-government forests, is petty. Is this service worth anything?

Flood damage costs the Nation annually about \$100,000,000, and erosion, about \$1,000,000,000. The Forest Service is demonstrating a principle which, generally applied, will greatly reduce both these losses. Is this worth while?

Again, the questions of irrigation, waterways, and water-powers are of far-reaching financial importance. The problems raised by them can be solved only with the aid of forestry as preached and practised by the National Forest Service.

When these larger aspects of the work of the Forest Service are considered it is obvious that, if the pecuniary returns from the National Forests were nil, and the present appropriations for National Forest work were doubled, the Service would still constitute an enormous national asset, a paying public investment of the first rank.

Yet, in the face of these facts some have the hardihood to allege that the people are paying a Federal bureau to collect "nine dollars from the public in order to have one dollar returned for schools and roads!"



The Weeks Forestry Bill

THE Weeks Forestry Bill (H. R. 11798), "to enable any state to co-operate with any other state or states, or with the United States, for the protection of the watersheds of navigable streams," etc., is again before Congress.

This bill, in fact, was introduced July 23, 1909, though action was impracticable during the special session.

The text of the bill will be found elsewhere in this issue.

It is encouraging to note that the press has begun the campaign for the enactment of this measure. The *Boston Journal* points out the pressing character of the need for such legislation, saying:

"Everybody who knows the conditions in the eastern and southern forests knows that there is absolute necessity for measures to check their destruction without delay."

Mr. J. C. Welliver, in the *Baltimore News*, says:

"In behalf of the Appalachian project it is urged that time is pressing. Unless steps are soon taken, there will be no forests left to preserve in the Appalachians, because the trees are being cut away about as fast as men and money and skill can make it possible."

The *Boston Globe* says:

"At the present rate of cutting, the forests on the high slopes of the White Mountains will be gone in a few years."

Again, it is pointed out that the chief opposition to this measure comes from men of the type of Speaker Cannon, Representative Tawney, and Chairman Scott, of the Agricultural Committee, together with a number of western congressmen, some of whom are unfamiliar with forest conditions in mountain states, while others are hostile to the National Forest policy where it already operates.

The attitude of the President is still in doubt. The general conservation question was passed over in his message to Congress with the statement that it would be considered in a later special message. Whether, however, this coming message will extend hope to the friends of the Weeks bill is uncertain. Such of them as have visited him in behalf of the measure have thus far received little encouragement. "Mr. Cannon," we are told, "has let the President know that he is opposed to the project at this time, and, although the President has a strong liking for Mr. Weeks and greatly respects his judgment, yet in this case he is more inclined to side with Mr. Cannon than he is with Mr. Weeks."

The principal objection thus far raised is, the old one of "expense." We are told that the present administration must make a record for "economy," and that such legislation, before its conclusion, is liable to involve the country in an enormous outlay.

As has been repeatedly pointed out, however, in these columns, the cost of such legislation is trifling in comparison with the returns. The question is simply that of "saving at the spigot and wasting at the bung-hole." Foreign countries have deferred action until forced by necessity to take it and have then found that the cost was vastly greater and the gain far less than would have been the case had the "stitch in time" been taken.

But should the expense be considerable, the wisdom of a bond issue to meet it is now being discussed. Says the *Boston Journal*:

"The issue of bonds to carry on a great forestry program seems to be one of the most logical and easily justified employments of the national credit. The argument that 'posterity will get the benefit, so let posterity pay,' is generally illogical. Applied to a great public work the rule is that the work has to be paid for after its greatest utility is exhausted. But in the case of forests, which must grow before they can be used, there is certainly logic in the argument of letting posterity pay."

To what extent the Speaker will interfere with the consideration of this measure is an interesting question. That he is able to keep legislation from the House everybody, of course, knows though not everybody cares to admit. One of his followers, Congressman C. A. Sulloway, in defending the Speaker against criticism makes an interesting admission. As quoted in the *Manchester (N. H.) Mirror*, he says:

"Speaker Cannon did not vote for the (Weeks) bill, but he permitted it to receive consideration in the House when he could have prevented it."

When fighting the United States Bank, Benton made good use of the admission of the friends of the bank that that great institution had not injured other banks, although *it might have done so*. The Senators emphasized the point that the power to injure rival concerns was too dangerous to leave with such an institution.

It is for the country to judge whether the Speaker's power to prevent the consideration of legislation reported favorably from a committee and ready to be passed by the House, is not too great a power for any man to wield.

Meanwhile the friends of the measure will rally. They will concentrate their efforts, first upon the Agricultural Committee, in which the bill now reposes, and then upon the members of the House to ensure its enactment, realizing that, if they would obtain some fraction of the kernel instead of being required ultimately to buy the mere shell of the Appalachian forests, they must act at once and with all their wisdom, persistence, and energy.



A Congressional Investigation

AT THE adjournment of Congress for the holiday recess arrangements were being made for an investigation of the Department of the Interior, as a result of the controversy of the last few months, the features of which have become so familiar to the American people. Secretary Ballinger has demanded also the investigation of

the Forest Service, on the ground of "pernicious activity." In this it seems to us the Secretary goes too fast. Logically the latter can and should wait. If the serious charges involving certain officials of the Interior Department are sustained the Forest Service men who may have been instrumental in assisting to unearth the facts cannot be accused of pernicious activity. Under what principle of ethics or even of official etiquette are officers of one branch of the Government estopped from exposing wrongs committed against the people, even by officers of another branch of the Government? If Secretary Ballinger shows that he has been wronged there will be time enough to determine what means were used to discredit him and the country will support such an inquiry in the interest of fair play.

On the general question there can be no doubt that the limit of the public patience is about reached and that a thorough, searching and judicial investigation of the facts is demanded in justice to the individuals concerned, to the administration as a whole, of which they are a part, and to that larger body which is most vitally concerned but receives scant consideration—the American people.

This investigation must not be political if it is to have public confidence. It is a regrettable fact that the exoneration by President Taft of Secretary Ballinger from the criticism of his course implied in the statement of Mr. Glavis, failed to convince the people, notwithstanding their high regard for the Presidency and for the judgment and integrity of its present incumbent. It was quite generally felt that the President felt compelled at that juncture to sustain the Cabinet officer he had so recently appointed. Similarly any congressional investigation that bears any suspicion of being "framed up" to meet party exigency, to "whitewash" any one, or to do anything except to find and report the real facts that affect the people's property and the honest administration of the laws, will fail to win the acceptance of the Nation and will make far worse what is already a bad matter.

There is a rising tide of suspicion, confined to no one section of the country and to no one party, of the way these things are managed. We do not undertake to say whether this suspicion is well grounded or not. This we do say, however, if we are now to have an investigation of what is growing into a national scandal, let it be, as Mr. Ballinger and Mr. Pinchot are said to have requested, public. Let it be also free from suspicion of partisanship; free from suspicion of being tampered with in the interest of any man or group of men. Otherwise the last state of this unpleasant affair will be worse than the first. We want a clean bill of health that we can have no reason to doubt, or a competent diagnosis of the disease and means for its cure.



Secretary Ballinger on the Power-site Question

SECRETARY BALLINGER'S recommendations on the power-site question were published in *Conservation* for December (page 780). Their liberal character has occasioned much comment.

His recommendations may be summarized as follows:

The titles to the water-power sites should be reserved by the the United States Government; grants of sites should be limited to a maximum of thirty years; grantees of water privileges must develop at least twenty-five per cent of the power capable of development within four years; a moderate charge must be made upon the capital invested or upon the gross earnings of the project in its first ten years of operation, adjusted at each subsequent ten-year period, and equitably determined by appraisalment; rights to be forfeitable upon failure to develop power or upon combination by grantees to fix exorbitant rates.

Commenting on these proposals, the *Rocky Mountain News*, a leading opponent of "Pinchotism," editorially protests (November 30), declaring:

"The *News* is frankly hostile to at least one portion of the Secretary's water-power device. This is, in brief, the

proposal that the person who wishes to develop a water-power on the public land must not only pay a Federal tax for the privilege, but must file on the water rights, under the laws of the state or territory, *and then transfer the water rights to the Federal Government.* This would be simply a legal or quasi-legal method of doing what Mr. Pinchot seeks to do in defiance of law. It would make water-power development costly in the public land states and territories; it would be a tremendous barrier to development; and, more than all, it would constitute the Federal Government not merely a landlord, but a waterlord; and a waterlord exempt from local taxation. We do not believe any part of this can be reconciled with the claims of either justice or expediency."

Why the Secretary's apparent "conversion?" That his report would be liberal was well understood in advance of its appearance. The explanation given by some is "the hammering bestowed upon the Secretary which has awakened him to the necessity of getting into line." "White House influence" is also referred to. The President, it is claimed, "appreciates the necessity of putting his administration squarely behind the conservation movement. From a political standpoint," it is said, "he cannot afford to do otherwise. * * * Besides, Mr. Taft is said to have returned from the West with a much more definite idea of the necessity of safeguarding the natural resources than he had earlier in his administration." And this feeling, it is believed, has communicated itself to the Secretary of the Interior.

One fact should be clearly understood by those who seek to protect the power sites from monopolization. The withdrawal of sites by the Secretary is, as he has repeatedly indicated, and again in the above report, only "temporary." "Without such withdrawals," he has declared, "these sites would be enterable under existing laws, and their patenting would leave the General Government powerless to impose any limitations as to their use. If the Federal

Government desires to exercise control or supervision over water-power development on the public domain, it can only do so by limitations imposed upon the disposal of power and reservoir sites upon the public lands." The Secretary, therefore, advises Congress to enact appropriate legislation.

Now, suppose that, as has happened in countless other instances, Congress does not act. The Secretary of the Interior will have washed his hands in innocency. He will be able to point to his report and say that he indicated the danger and called upon Congress to meet it, but that Congress failed to do so, and that, therefore, great as is his desire to protect the public interests, Congress itself, by its inaction, has forbidden him. All, therefore, that will remain for him to do will be to throw down the bars and let the cattle into the standing corn.

Clearly the matter is now "up to" Congress, and upon that body rests the responsibility for meeting the situation. Further, the Secretary, by his recommendations, has placed himself in a happy position. If Congress acts, he can claim the credit; if it fails to act, he can plead "not guilty."

But not so fast. To make recommendations is easy, especially if there is ground to suspect that they will be pigeon-holed. The test of the Secretary's earnestness in the public behalf is yet to come. Will he stop with making recommendations and peacefully sit in his swivel chair while Congress debates all manner of other questions and prepares to "pass the appropriation bills and go home?"

If the Secretary will acquit himself of the suspicion of lukewarmness in this matter, he must go much farther. It is a matter of record that he knows the way to Capitol Hill, and that he has appeared before congressional committees and urged the enactment of legislation, notably in the matter of the Alaskan coal claims. Will he again go before appropriate committees, and again, with the prestige of his great office, and

with the ability which he has manifested on other occasions, press upon those committees the far-reaching and paramount importance of enacting into living legislation the recommendations which, otherwise, must lie dead in a dust-covered report?

In this connection the case of a western governor, now deceased, is recalled. Certain legislation, odious from the standpoint of the public well-being, was before the legislature. The monopolists had so completely accomplished their perfect work as to have an overwhelming majority in each house. Next, by one of the shrewdest moves on record, they endeavored to buy the governor's acquiescence by a plan which would have left him forever proof against discovery. He would be at liberty to protest against the legislation, but the legislature would pass it despite his protest. He might then veto the bill, but the majority was so large in each house that the bill would be passed over his veto. He would have squared himself with the voters, maintained his record as an anti-monopoly governor, and at the same time, be a million dollars to the good; and the corporations would have won.

But did he? Instead, with an oath, he spurned the bribe, doffed his coat and rolled up his sleeves for the battle of his life. To cut the story short, he blocked the game, beat the bill and saved the public interests. When he died, a few years later, a subscription paper was circulated for the benefit of his widow.

Now, the question for Secretary Balinger to answer is, has he the nerve of this heroic governor? Will he actually enter the lists for the people's rights? Will he not simply talk, but work? Will he organize a campaign for the enactment of such legislation as he has recommended, and will he lead the battle and so press it to the gates of the entrenched hosts of monopoly and special privilege that, when the Sixty-first Congress adjourns, his admirable recommendations regarding water-power sites will stand as the law of the land?

The Milk in the Coconut

AT BOTTOM, the conservation struggle is but another chapter in the warfare over the public domain.

This fight began with the establishment of our National Government. Seven of the thirteen original states claimed public lands; six held no claims. Whether the public lands should belong to the seven states or to the thirteen was an early bone of contention.

Since that day, the question of the public domain has again and again threatened the peace of the Nation.

America has been singularly blessed in the size and richness of her public domain. Upon it, as was pointed out by Thomas Carlyle, has rested, in large measure, the success of her free institutions.

This domain has been estimated to equal, at its maximum, 1,000,000,000 acres.

Various devices have been adopted for its disposition. Sales, leases, the offering of lands at auction at an upset price, the preemption law, coal-land laws, and the like.

The most famous law for the disposition of the public domain was the homestead law, signed by President Lincoln, May 20, 1862.

Of this law, the Public Lands Commission of 1880 said: "It protects the Government; it fills the states with homes, it builds up communities and lessens the chance of social and civil disorder by giving ownership of the soil, in small tracts, to the occupants thereof."

For a period, this law bore admirable fruit; it has now, however, apparently about reached the limit of its usefulness. Is the reason for this to be found in the fact that the public domain has all been disposed of? Not at all, for it is estimated that about half of the original billion acres still remains the property of the Nation.

The trouble lies not in the shrinking of the public domain, but in the inapplicability of the homestead law to the character of that domain as it now exists.

To this fact the Secretary of the Interior has borne testimony. In his last report but one he said: "The homestead law is not applicable to much of the balance of the public domain."

There is a fundamental difference between the character of the lands taken up under the homestead law and those still remaining in national ownership.

The former were, for the most part, arable and rich. Those now remaining are largely arid, semi-arid, mountain and forest.

For the settler to take up a quarter section of arid land avails him little. Provision must first be made for reclaiming this land by the application of water; but with irrigation this land becomes so productive that, in many instances, a quarter section is far too much to allow to a single settler.

On the great public range, suitable as yet only for grazing, the quarter-section proposition is again found inapplicable, and cattle and sheep kings would be the first to oppose its introduction.

The application of the homestead principle to mineral lands leads to grotesque results. A single area of 160 acres may prove more valuable than whole counties of agricultural land; while, through the use of dummy entrymen, the property of one owner may be vastly extended.

Again, unless we are willing to dispense for the most part with forests, the homestead principle breaks down when applied to forest land. Here, in many instances, private property in land is strikingly inappropriate, and here, again, dummies have been used with telling effect.

To the intelligent observer, interested primarily in the public well-being, it has become evident that much of our existing public domain must be handled on different principles than those underlying the homestead law.

But suppose our remaining public domain were as arable and rich as the Mississippi Valley, and, under the homestead law, were all disposed of to private individuals. Have we stopped to think what would happen next?

Let the reader glance at the population table of the United States, showing our total millions from 1790 to 1900. By decades, these will be found to run as follows: Three, five, seven, nine, twelve, seventeen, twenty-three, thirty-one, thirty-eight, fifty, sixty-two, seventy-six.

Does any one imagine our population has reached the limit of its growth? If not, where will the additional millions look for land when all the existing lands have been taken up by those now living and turned over to an equal number, let us say, of their descendants?

It may be well that, before all our public lands were thus reduced to private ownership, we were compelled to face arid, mountain, and forest lands. We thus found opportunity to stop and think.

In consequence, we are learning that, whatever merit may attach to the principle of private property in land, that principle is not of universal application.

We have learned that, as regards some lands, at least, public ownership, and administration in the public interest, are essential and indispensable.

How much farther we may need to carry this principle we do not yet, as a people, know. We shall probably learn, as we have learned many other things, by experience.

But now comes a movement, petty, it may be, in numbers, but aggressive, and well represented in Congress, declaring that it is a "crime to perpetuate the public domain," proposing to "throw off the incubus of Federal control," and, while hedging a little as regards "the actual timbered lands of the public domain," demanding that "every natural resource pertaining to the public domain * * * shall pass * * * into the ownership of the individual."

Here we have a direct issue, intelligible to the simplest mind, sharp, clean-cut, unequivocal: On the one hand stands national ownership and administration; on the other, the demand that such ownership and administration end, and that individual ownership and administration and *laissez faire* take its place.

Between these two positions there is a great gulf fixed. They can no more be harmonized than light and darkness, plus and minus, or zenith and nadir. The opposing principles involved will no more blend than will oil and water.

Veil it as we may, juggle it as we will, this is the issue that lies at the base of the Ballinger-Pinchot fight.

Personalities may interest; and slanders and graft charges may whet the morbid appetite; but more fundamental by far than personalities, slanders, or graft are broad questions of public policy.

Such a question, *par excellence*, is the question whether the public domain shall, in substantial measure, remain in public hands to be administered by the public for the public good, or be turned over to individuals to be exploited for private gain. In this lies an issue which may well challenge the attention of student, citizen, and statesman, and upon whose wise settlement depends, in large measure, the permanent well-being of the Nation.



The Interest of "The Interests" in Irrigation

A NEWS item published in Denver on December 12 makes interesting reading. In part, it runs:

"The Camfield Development Company yesterday secured control of the Henrylyn and the Golden-Littleton irrigation systems in a deal which involves \$4,000,000. David H. Moffat, William G. Evans, Gerald Hughes and other capitalists are interested in the Camfield concern."

This taking over involves a purchase of the entire bond issue of two districts—\$432,000—by the company, and their cooperation with a firm of Chicago bond brokers. A hundred thou-

sand acres of the land are in southern Weld County, while the remainder are close to Denver. The territory along the new line of the Union Pacific is also included, as is land along the Burlington's new line to Greeley. "Within this great empire," we are told, "the railroads of Colorado and the promoters of land and irrigation projects have planned to spend \$10,000,000. In a few years more, it is estimated this territory will add at least 20,000 population to the state."

All of which throws additional light on Secretary Ballinger's Spokane speech, in which he expressed great friendliness for private irrigation enterprises, and a keen desire that Government irrigation should be kept well out of the way of all such. Furthermore, it harmonizes with the talk heard about the Capitol. Where the irrigation job is too big, or difficult, or unpromising to attract private capital, Government, as Adam Smith taught, may be permitted to take the risk. But where there are profits to be garnered, however heavily the taking of these profits may bear upon the producer, Government must stand aside and private capital must have the right of way.

Is this one of the "Roosevelt policies" which were to have been so religiously carried out? We confess that we had not so understood. If, on the other hand, the Roosevelt irrigation policy is that of using the Government in so far as practicable to aid the common man in establishing, with as little expense as may be, a home for himself in the arid regions, are we not finding here another illustration of the way in which those policies, as has been suggested, are being "carried out on a shutter?"

THE MONARCH OAK

The monarch oak, the patriarch of the trees,
Shoots rising up, and spreads by slow degrees.
Three centuries he grows, and three he stays
Supreme in state; and in three more decays.

—Dryden

STATE WORK

Massachusetts Forestry Association

The Massachusetts Forestry Association held its twelfth annual meeting in Boston Thursday, December 16. Dr. Henry P. Walcott retired from the presidency, which he has held continuously since the association was organized in 1898. Edwin A. Start retired from the secretaryship after nine years of service. The annual report of the secretary showed a membership of 901, a net increase of twenty-four. The report reviewed the work of the year, most of which is embraced in matters still pending. In view of the change in its executive officers, the secretary summarized the results accomplished by the association in its brief career and the progress made by forestry in Massachusetts since 1898, when it was almost unknown to the people of the state. Now Massachusetts has perhaps the best shade-tree laws of any state in the Union, and one of the most complete and liberally supported forest services. The association takes pride in the fact that its interest in the forestry movement has been national as well as local, a fact that it has proved several times in practical ways, and especially in its support of the Appalachian National Forests project.

The association has about \$11,000 invested in its permanent fund. It maintains a pleasant office at No. 4 Joy Street, Boston, open during business hours, and publishes a small monthly bulletin, *Woodland and Roadside*.

These officers were elected: President, Nathaniel T. Kidder, of Milton.

Vice-presidents: Berkshire—Alexander Sedgwick, of Stockbridge; Bristol—Walter C. Baylies, of Taunton; Essex, Harlan P. Kelsey, of Salem; Franklin—John A. Aiken, of Greenfield; Hampden—William F. Gale, of Springfield; Hampshire—William P. Brooks, of Amherst; Middlesex—J. Nelson Parker, of Billerica; Norfolk—D. Blakely Hoar, of Brookline; Plymouth—Harry E. Converse, of Marion; Suffolk—Charles S. Hamlin, of Boston; Worcester—John E. Thayer, of Lancaster.

Secretary, Irving T. Guild, of Arlington; treasurer, Edwin A. Start, of Billerica; members of the executive committee for three years, Mary Lee Ware, of Boston; Frederick J. Caulkins, of Medford; trustee of the permanent fund for three years, George M. Weed, of Newton; auditor for two years, James Nowell, of Winchester.

The following minute was unanimously adopted. It records the service of one of the

earliest and most consistent friends of forestry in Massachusetts, and one of the first citizens of the state:

"Eleven years ago Henry P. Walcott became the first president of the Massachusetts Forestry Association, and he has continued since that time at its head. During these years we have found him always a loyal friend of forestry, a wise counsellor, a courteous and impartial president. To his influence the association owes much of its growth and efficiency. As he retires from office we tender him our grateful acknowledgment, our cordial regard, and our hope that the presidency of this association may rank as not the least among his many distinguished public services."

The business session was followed by a series of reports from experts of the state service and of Harvard University on some of the principal insect enemies of Massachusetts trees and the progress made in cultivating parasites and other insect enemies to control them.



Annual Meeting Vermont Forestry Association

The annual meeting of the Vermont Forestry Association was held at Brattleboro, December 17.

This was the first regular meeting of the association after the organization of the State Forest Service, which was so largely due to the work of the association. There were afternoon and evening sessions well attended by people from Brattleboro and a few from distant points in the state. The aim of the association has been to hold these annual meetings in the various centers of the state so as to interest a great many people.

Governor Prouty, who was present and is much interested in the forestry movement in the state, spoke in the afternoon regarding the work of the Forest Service and expressing himself in favor of an adequate extension of the work, especially in regard to the purchase of state lands.

Among the other speakers were Mr. Charles Greene, formerly of the International Paper Company, who outlined a plan for the acquisition of lands later to be turned over to the state. A. F. Hawes, state forester, spoke on the forest-fire problems of the state. Hon. Ernest Hitchcock, former commissioner, spoke on the subject of taxation. Professor

Taylor and Mr. Joseph DeBoer, president of the National Life Insurance Company, and Mr. Allen M. Fletcher, of Cavendish, also spoke.

Resolutions were passed by the association expressing its hearty appreciation of the work which Prof. L. R. Jones has done for agriculture, and especially for forestry in Vermont, and wishing him all possible success in his new work in the University of Wisconsin.

Other resolutions were passed in favor of the policy of the State Forest Service looking toward the purchase of more extensive state forests, and a change in the taxation and forest-fire laws.

It was brought out at the meeting that one state forest of 450 acres has already been acquired in Plainfield, Vt.; and that the state nursery now has about 2,000,000 trees started.

The Hon. Fletcher Proctor was elected president for the ensuing year; Hon. George Aitken, of Woodstock, and Allen M. Fletcher, Cavendish, vice-presidents; Hon. Ernest Hitchcock, of Pittsford, secretary and treasurer.



Louisiana Forestry Association

The Louisiana Forestry Association was organized April, 1909. The articles of association were drawn up in June and active work then begun. The association now numbers ninety annual members and one life member. The association took part in the successful meeting of the Southern Conservation Congress held in New Orleans November 1, being represented by its president, Henry E. Hardtner, and others.

The collecting of tree seeds and their distribution to those persons desiring to plant them, is one of the features of the association's work. New tree seeds, which the Government is anxious to introduce in the South, will be sent from the Botanical Garden to this association. When they are well started they will be given out to individuals to be placed in parks or homes. Fifty packages are promised for planting this season, and can be secured by any one upon application to the association's secretary, Mrs. A. B. Avery, at Shreveport, La.

Governor J. Y. Sanders is lending valuable aid to the organization, and has promised to set aside five acres of land to be used for a nursery at the experiment station at Calhoun, La.

Through the educational department of the state, lectures on forestry will be given at the teachers' institutes, and at the annual meeting of the Teachers' Association. These lectures will be provided by this association from the United States Forest Service, and those desiring their services should make application to the secretary, as they can only be secured through the association.

By the courtesy of the United States Forest Service, this association has secured through its secretary a complete file of all books and leaflets published by the Government pertaining to forestry, and any one desiring to consult any book can do so upon application at our office.

The annual meeting of the association will be held January 4, 1910, at Minden, La.



State Interest in Water-powers

Governor Hadley, of Missouri, has recently been exploring the Ozark region, one of his objects being the development of water-power as a state resource. Says John L. Mathews, in the *Boston Transcript*:

"On the water side Governor Hadley has before him the example of Illinois spending \$20,000,000 for state development of water-power; and he is eager that Missouri shall not be outdone. The pellmell streams of the Ozarks have power enough to run all the industries of Missouri. He has recently established a waterway commission headed by W. K. Kavanaugh, of St. Louis, to investigate both power and navigation questions; and the work of this commission was also a factor in leading him to the rapid water of Current River, with their engineer, Mr. M. L. Holman."

Iowa also is interested. Says the *Des Moines Capital*:

"The state conservation commission has begun the work of collecting data pertaining to water-power in Iowa. Secretary Dobson yesterday mailed letters to the officials of every town and city on all the principal rivers in Iowa, asking for information concerning present and defunct water-power plants. There are many old gristmills and other mills, located on rivers throughout the state, that long ago suspended operations. It is the desire of the commission to know what fall of the river was utilized for water-power. The idea of the commission is to make a comparison of the water-power now in use with that which has been abandoned. The main purpose of the entire campaign looks to the increasing of the water-power in summer time."

In Wisconsin a legislative committee on water-power, forestry, and drainage has been holding hearings. Mr. E. M. Griffith, state forester, stated to this commission that while the state does not own dams, or banks of overflowed lands, it does own the energy of the running water, and that the state alone has a right to give a permit to use this energy under its police power.

Mr. Griffith insisted that "the state should stand to the last ditch on every water-power right it had." His opponents argued that this would block water-power development, but the necessity of this he absolutely denied.

NEWS AND NOTES

Mr. Pinchot's Latest Shot

Following are extracts from Mr. Gifford Pinchot's speech of Monday, December 27, before the University Club of New York City:

"The conservation issue is a moral one. When a few men get possession of one of the necessities of life, either through ownership of a natural resource or through unfair business methods, and use that control to extort undue profits * * * they injure the average man without good reason, and they are guilty of a moral wrong. * * *

"The income of the average family in the United States is less than \$600 a year. To increase the cost of living to such a family, beyond the reasonable profits of legitimate business is wrong. * * *

"I believe in our form of government, and I believe in the Golden Rule. But we must face the truth that monopoly of the sources of production makes it impossible for vast numbers of men and women to earn a fair living. * * *

"Thousands of daughters of the poor fall into the hands of the white-slave traders because their poverty leaves them without protection. Thousands of families, as the *Pittsburg Survey* has shown us, lead lives of brutalizing overwork in return for the barest living.

"Is it fair that these thousands of families should have less than they need in order that a few families should have swollen fortunes at their expense? * * *

"The people of this country have lost vastly more than they can ever regain by its gifts of public property, forever and without charge, to men who gave nothing in return. * * *

"The people of the United States have been complacent victims of a system of grab. * * *

"President Hadley well said that 'the fundamental division of powers in the Constitution of the United States is between voters, on the one hand, and property owners on the other.'

"When property gets possession of the voting power also, little is left for the people. That is why the unholy alliance between business and politics is the most dangerous factor in our political life.

"I believe the American people are tired of that alliance. They are weary of politics for revenue only. It is time to take business out of politics, and keep it out—time for the political activity of this Nation to be aimed squarely at the welfare of all of us, and squarely away from the excessive profits of a few of us. * * *

"We have allowed the great corporations to occupy with their own men the strategic points in business, in social and in political life. * * *

"There are many men who believe, and who will always believe, in the divine right of money to rule. With such men argument, compromise, our conciliation is useless, or worse.

"The only thing to do with them is to fight them and beat them. It has been done, and it can be done again.

"It is the honorable distinction of the Forest Service that it has been more constantly, more violently, and more bitterly attacked by the representatives of the special interests than any other Government bureau.

"These attacks have increased in violence and bitterness just in proportion as the Service has offered effective opposition to predatory wealth. * * *

"We hold it to be the first duty of a public officer to obey the law. But we hold it to be his second duty, and a close second, to do everything the law will let him do for the public good, and not merely what the law directs or compels him to do. * * *

"Still another attack, nearly successful two years ago, was an attempt to prevent the Forest Service from telling the people, through the press, what it is accomplishing for them, and how much this Nation needs the forest.

"If we cannot tell what we are doing, the time will come when there will be nothing to tell. * * *

"Since the Forest Service called public attention to the rapid absorption of the water-power sites and the threatening growth of a great water-power monopoly, the attacks upon it have increased with marked rapidity.

"I anticipate that they will continue to do so. Still greater opposition is promised in the near future. There is but one protection—an awakened and determined public opinion. That is why I give you the facts."

Mr. Garfield Speaks at Last

Mr. James R. Garfield, Secretary of the Interior under President Roosevelt, from whom an expression on the conservation question has long been expected, has at last spoken in an address at the University of Wisconsin and before the Merchants' and Manufacturers' Association of Milwaukee. This address is published in full in *La Follette's* for December 18. Though worded with studied care and self-restraint, it has already created a flutter in the flock of opponents of conservation. Following are some extracts from Mr. Garfield's address:

"Conservation is preeminently a movement for the public welfare. The public welfare demands equality of opportunity for all citizens in the use of natural resources. * * *

"In opposition to public welfare is that kind of private interest which selfishly seeks to control natural resources solely for its own benefit. * * *

"Exactly as the railroads are regulated because they are public utilities, so must the interests that develop natural resources be regulated because they deal with public necessities. Unfair use or monopolization of either is intolerable. * * *

"The enormous increase in the use of water for power and irrigation, and domestic consumption, has induced great activity on the part of big interests to acquire as many available reservoir and power sites as possible—there was imminent danger that such sites left on the public domain would be filed upon and obtained under conditions that would in no wise protect the public, but would make monopoly possible in the near future. * * *

"No more intolerable monopoly can be imagined than that which would control the water supply of any great section of our country. * * *

"The people properly consider the executive as their particular advocate, their special representative. His stewardship carries with it grave responsibilities and affords splendid opportunities to serve the people well. * * *

"President Roosevelt * * * was willing to take action for the public welfare unless there was some prohibition under the constitution or in law to prevent such action. * * *

"The danger to the conservation movement now is inaction. The public welfare demands action. No condition is so satisfactory to aggressive private interest as inaction on the part of the public authorities. * * *

"The fight for conservation is now in the halls of Congress. * * * It is not an easy task to obtain legislation which is opposed by great vested interests. We may be sure that all the men and corporations who have in years gone by acquired ownership or control of land, timber, coal, oil, phosphates, and water, free from regulation or condition and without just compensation to the public, will not voluntarily acquiesce in the proposed

changes. There is no danger that the rights and demands of such interests will be neglected; the danger is that the public interest may be forgotten.

"The people must see to it that their side of these great questions is as keenly watched, as capably presented as is the side of private interest. * * *

"It is easier to prevent legislation than to obtain it, hence the people will have the more difficult task in the pending struggle, but they can win if their leaders are true to their trust. * * *

"We pride ourselves upon our freedom, our individual liberty of action—yet this is an idle boast, a sham, unless we ensure equality of opportunity to every citizen, and use every effort to increase his vital, intellectual, and moral efficiency."



Another Bombshell for Ballinger

Collier's for December 18 fires another bombshell into the Ballinger camp. Senator Heyburn, furthermore, for years one of the most relentless and irreconcilable foes of the Forest Service, finds himself in a position strikingly suggestive of that of the onetime Senator Mitchell, from Oregon.

Of the article referred to, *Collier's* says editorially:

"In the opinion of the most intelligent and disinterested class of men now in public life, no achievement in President Roosevelt's administration compared in importance with the successful turning of the tide against the robber barons, and in favor of the people, in that immensely valuable area known as our natural resources. Can the people prevent the present administration from chloroforming the movement and bringing us back to the grand old days of McKinley's first administration, when everything was smooth and orderly, and Robin Hood was in the saddle? If the administration had shown any desire to do more than fix up plausible white-washes and virtuous annual reports, *Collier's* would not be worrying itself with the task of ferreting out and arranging the vast amount of evidence. If we were sure that Congress would furnish a full investigation, by a fair-minded committee, our own role would end. We are not convinced, however, and therefore are forced by incalculably large public interests to remain ourselves upon the firing line now, and perhaps for many months to come.

"The article * * * will interest the public. Whether it will influence Congress, we do not know. That it will appeal to the Attorney General or the President, we in no wise think.

"It demonstrates:

"1. That Glavis's article in *Collier's* merely tapped one vein. What is given here is more far-reaching. From the point of view both of politics and of criminal law, it is more serious.

"2. That Ballinger's railroad and mining connections are intricate and extremely in need of explanation. Instead of representing one client, and that slightly, as the President was induced to say, his relations to such business were well-nigh numberless. He had almost a monopoly of Seattle law where political favors were essential.

"3. That Senator Heyburn, Commissioner Dennett, and other officials are deep in trouble along with Ballinger. This trouble is not merely moral. It looks very much as if some of them had crossed the line of legal danger.

"4. That there is good reason for Cabinet and Senators to urge President Taft to do all he can to smother evidence, one of the reasons being that Ballinger tried to stop Glavis' investigations at one point in order to help Mr. Taft's election. The claimants would not help contribute to Mr. Taft's campaign fund unless the investigations were stopped.

"This contribution is not all. Much is still kept back for reasons that are sufficient. This instalment will be enough to show how much the administration is undertaking when it makes itself responsible for Ballinger, and tries to hide behind either a thick coat of whitewash or a sweet-sounding annual report. Probably Mr. Taft will say, with Dryden:

'Now let the bold conspirator beware.'

"It is only a few days since he issued an executive order, the result of which is that no member of the Interior Department can testify before Congress without the express approval of Mr. Ballinger. This joke becomes the more diverting when it is known that the Secretary is performing quiet bits of legerdemain in his department, now, at the very moment when he is filling the earth with virtuous noises."



Billions of Treasure

In McClure's for January appears an article under the above title by Messrs. John E. Lathrop and George Kibbe Turner.

This treasure is the enormous coal deposit of Alaska, conservatively estimated to be worth at least one and one-half billion dollars. The story shows how the syndicates, politicians, and grabbers generally have for years been endeavoring, without authority of law, to obtain possession. In the spring of 1904, these coal hunters "went after Alaskan legislation" and got it. "From this time on the Cunningham group took the lead, naturally. They were millionaires, captains of industry, and men of large political influence. They broke the way for the other groups, financially and politically.

"The general business management of this syndicate was in the hands of its promoter, Clarence Cunningham. He kept a ledger, cashbook, and a careful and detailed journal of its accounts. In the journal, un-

der date of September 19, 1903, this memorandum appears:

"Have agreed with Mr. W. B. Heyburn in consideration for his services as attorney to carry him for one claim of 160 acres in the coal, free of cost to him, and he agrees to do all our legal work in procuring titles, etc., free of expense to us."

Senator Heyburn's fee, the writer estimates, "would have a value of one and one-half million dollars in commercial coal. * * *

"In September, 1903, Mr. Heyburn was a United States Senator, having been elected by the Idaho legislature eight months before."

In the spring of 1904 Mr. Heyburn secured the passage of the Alaska Coal Land Bill of April 28. "This broke the circle in which the law of 1900 had placed the Government's coal in that district, and allowed it to be taken over by persons who had surveyed it at their own expense."

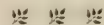
Suddenly, the Government turned its attention to land frauds in the Northwest and "toward the end of 1904 John H. Mitchell, of Oregon, was indicted for being a party to these frauds while a Senator of the United States." Senator Mitchell was sentenced to prison. On October 20, 1905, Senator Heyburn wrote a letter to Cunningham declaring four different times in four different ways, "I do not desire to participate in, or be interested in any manner, directly or indirectly, in acquiring public lands."

"This letter was written two years and one month after the record in Clarence Cunningham's journal of Mr. Heyburn's employment."

Later the Guggenheims appear as the leaders in Alaskan exploitation. Seattle, the headquarters for all things Alaskan, furnished the Land Office, Richard A. Ballinger becoming Land Commissioner, Fred Dennett, of the same city, being his assistant, and his nephew, "Jack" Ballinger, his confidential secretary.

Then follows the story of Ballinger's connection with Alaskan coal lands, and Glavis's attempt to save these lands from the syndicate, the whole being full, detailed, and specific.

The Glavis letter, the *Collier's* story of December 18, and the *McClure's* story of January, are matters which the coming investigating committee will be expected to probe to the bottom.



Coming Out into the Open

"The West will not consent to a policy of administration that would sell or rent water-powers for the benefit of the 'whole people.' Water-powers in New England are not so 'conserved.' Then why in Oregon? * * * Just to satisfy a hazy demand in the East for 'conservation.'"—*Portland Oregonian* on conservation.

"The water runs down our mountains, and most of it flows idly to the sea without turn-

ing a wheel, but to prevent grabbers from acquiring vested rights the theorists insist that it must keep on flowing idly until it can be made to yield tribute. * * * These new policies have their roots in paternalism, their tendency is toward despotism, and if not checked they will choke to death our boasted government of the people, by the people, and for the people."—Judge Hanford, at the Alaska-Yukon-Pacific Exposition, Seattle.

"Your policies cripple industries and development, and thereby instead of conserving resources cause their waste and destruction."—Frank Short, of Fresno, Cal.

"The fact that one authority is financially allied with the claimants to the Alaska coal lands, that another represents the largest private power and irrigation project in his state, and that the other is attorney for consolidated power companies, does not in the least reflect on the sentiments expressed in the paragraphs printed (above).

"Each authority practises exactly what it preaches—corporation acquisition of the big public resources."

Thus began an article by Agnes C. Laut in *Collier's* for December 18, entitled "Water-Power in the East." The article is a clear setting forth of the work being done in New York State to conserve the water-powers for the benefit of all the people rather than for the private profit of a few corporations.



Waning Opposition

In view of the perennial eruption of the mud volcano in Denver and the resolute, unscrupulous, and now apparently confident efforts of those responsible for it to submerge Mr. Gifford Pinchot and the Forest Service, the following editorial from the *Denver Republican* is of interest:

"The attitude of the live-stock growers of this state toward the policy of the Forestry Service has undergone so radical a change that it must be accepted as evidence of a similar change in public sentiment.

"At one time the stock growers were largely arrayed against the Pinchot policy. They looked upon it as a violation of their rights and as detrimental to their interests. Their opposition gave occasion for the expression of like opposition by men not connected with the live-stock industry. For a brief period the Forestry Service was extremely unpopular in some quarters and with a certain element of the population, and politicians sought to take advantage of this antagonistic sentiment to promote their political success.

"That day has passed. The cattlemen have learned that instead of being detrimental, the forestry policy is highly beneficial to their interests. None of their rights have been violated; and from being hostile to the Service, they have become friendly and are now extending both sympathy and aid.

"The opportunity of the politicians who

hoped to gain favor by denouncing Mr. Pinchot is gone. They have to face a public sentiment which every day is growing stronger in his favor. It is a vindication of his policy which will be to him a source of satisfaction, and there is no question that it will promote the peace, good order, and prosperity of the state."



Lining Up for Conservation

Mr. J. Horace McFarland, president of the American Civic Association, addressed that body at Cincinnati with all his accustomed vigor and energy. Speaking of the Tawney amendment to the Sundry Civil Bill, he indignantly inquired:

"Is that infamous section of the Sundry Civil Bill, whipped through in the last hours of the Fifty-ninth Congress, which dissolved all Mr. Roosevelt's working commissions and swept away departmental support of the conservation movement, to be permitted to remain law? Its effect was to make intelligent interest in the future prosperity of America a crime on the part of any Government official. This legislation in the interests of the looters of the public domain cannot remain effective if good citizens speak directly to their congressmen."

Mr. McFarland wisely urges the conservationists to appeal vigorously to their congressmen to check the looters of the public domain. Nothing short of this can hope to save the situation.



Regulating Construction of Dams

Mr. Mann, of Illinois, has introduced into the House of Representatives a bill (H. R. 13834) "to regulate the construction of dams across navigable and non-navigable waters, and for other purposes." Following are some of its leading provisions:

When authority has been granted to construct and maintain a dam for water-power or other purposes across navigable water, plans and specifications, drawings, and maps must first be submitted to the Secretary of War and Chief of Engineers for approval. In approving such plans the above officials may impose such conditions and stipulations as they may deem necessary to protect the present and future interests of the United States. The United States shall be entitled to free water-power and power generated from water-power for building and operating locks or other structures for navigation purposes. Compensation may be required for permission to maintain dams and for the use of navigable water and for obstruction to navigation, and Government may regulate and control charges.

Failure to comply with the terms of the act works forfeiture.

The bill contains other interesting provisions. On the whole, it appears to be a step in the right direction.

The Fight for the Public Domain

In speaking of the vast value of our existing public domain and the struggle now waged by private interests to seize it, the *Boston Journal* says:

"Nobody is to-day willing to venture a guess at the marketable value of the vast domain still owned by Uncle Sam. But the figures will be available in a comparatively short time, and they will be startling, running, without question, far into the billions. Instead of the public domain being well-nigh exhausted; instead of there being little left save the frozen tundras of Alaska, the deserts of the Southwest, and the mountain rocks of the continental spine, it will be shown that there is still an arable area which will in time sustain millions, with mineral, forest, and metal reserves to maintain a tremendous industrial system."

The *Journal* next points out the efforts made by President Roosevelt to save this domain for the people, and then continues:

"During the last two years there have been withdrawals from entry of about 3,000,000 acres of oil and gas lands; these coming down to as recently^a as a fortnight ago.

"All the withdrawals are made pending legislation. Whether they will be continued indefinitely, or indeed can be, in the event that legislation fails, is a question of decided interest and vast importance. The advocates of conservation, fearing the answer to this question, are especially anxious that necessary amendments to the laws be secured this winter. The President and Secretary Ballinger will both state the necessities, in this regard, very forcibly in their annual communications to Congress. In Congress, just as the stake is shown to be immense, so will the opposition of private interests be intensified. These are highly organized. It is freely charged that they will have in Washington this winter one of the most expensive and influential lobbies that has ever descended on the Capital, determined to prevent legislation which will interfere with great projects for the further transference of the public domain to private and corporate control.

"In short, it is considered certain that the great struggle for the last of the public domain will see its real beginning at the coming session, and that the time will come, in the future, when it will be recalled as the most determined fight, for the greatest prize, that was ever controlled by action of the National Legislature."



"Let the Future Take Care of Itself"

The conservation policy to which the national administration is committed is opposed by a class of men who are under the illusion that the protection of public interests in coal and forest lands and water-power involves a sentimental sacrifice of the present to the future.

Senator Heyburn, of Idaho, represents this class. He wants powerful monopolies in his state, and does not hesitate to say that it is only through the rapid rise of monopolies, that a new country can be developed so that the present generation can enjoy life.

While admitting that this policy may entail a disadvantage to future generations, he thinks that they should be left to take care of themselves.

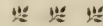
This theory of Senator Heyburn, which was acted upon by thousands of people before anybody had the hardihood to frame it, is not merely morally offensive—it is economically unsound.

The actual effect of the establishment of monopolies is not the sacrifice of the future to the present; it is the sacrifice of the mass of the people to a class. A feverish activity is set up by the offer of huge privileges to those who can first lay hands on them.

But a privilege is at bottom simply a taxing power lodged in private hands.

The advantage to general civilization is wholly illusory.

The gain of the privileged few is the loss of the multitude.—*Los Angeles* (Cal.) *Examiner*.



Attacking the Forestry Policy

A good example of the kind of attack that is being made upon Forester Pinchot and the forestry policy of the National Government is afforded by the following editorial that appears in a Denver newspaper that has been a leader in the campaign against this department of the Federal Government:

PIKE'S PEAK FORESTRY

"Upon the summit of Pike's Peak the peerless Pinchot has established a forest nursery. It is to be as nifty a nursery as Government money can furnish, and that is probably a good deal. Up there in the sky, where the chill wind blows, he will plant the little trees, all in neat little rows, and guard 'em as they stand on their cunning little toes, in the Pike's Peak Pinchot Garden.

Tell you what, it takes a head to think up a scheme like that. And we don't want to hear any carping criticism about timber lines and things. The laws of the United States have never held the Glorious Gifford as yet, and shall the laws of nature say him nay? Perish the thought. Let no skeptic scoff at this most marvelous of attempts to reforest the Rockies. It is true that several thousand feet lower than the site of the Pinchot nursery a lodge pole pine takes 135 years to grow a six-inch stick. But that doesn't matter at all. Mr. Pinchot is a dynamic geographer, or something of that sort, and he takes a broader view. The Pike's Peak nursery may not be much as a forest—but think what an adorable success it is as an advertisement!"

So much for sarcasm and innuendo. Now for the facts, which appear in a news item

in the *Colorado Springs Gazette* of the same date:

In order to determine just what trees are best suited to the reforestation of the Rocky Mountains, a Government forestry station has been established on the south slope of Pike's Peak, on Government land near Minnehaha Falls. Raphael Zon, chief of the division of silvics in the Government Forestry Service, passed through Colorado Springs yesterday on his way to Denver, after having arranged the station. He said that a species of lodge-pole pine has been brought from Wyoming, which, if it can be successfully raised here, will greatly increase the wealth of Colorado.

From which it appears that instead of the new forestry station being located upon the summit and above timber line, it is in fact near Manitou and in the region of natural forest. Instead of being a wild and insane freak it is in fact a most valuable experimental station and one that will be of very great benefit to all the people of all parts of the state.

The truth is that in spite of the misrepresentations of a few newspapers that have made a campaign against the national forest policy and against Forester Pinchot, based upon partisan prejudice and to some extent upon the selfish interests of those desirous of continuing the spoliation of the public lands, the people of Colorado generally approve the forestry policy. To protect the water sources so that floods may be prevented and a constant supply may be assured, to secure reforestation of areas denuded by fire and reckless cutting, to prevent the waste and destruction of present timber resources and to ensure a supply for future years, are recognized as worthy objects, and credit is given to the wise and far-seeing officials who have conceived the forestry policy and are carrying it into effect.—*Pueblo (Colo.) Chieftain*.



Water-power Sites in the Grip of the Trust

Investigating the connection between the Electrical Trust, particularly the General Electric and the Westinghouse companies, and the trust that controls water-power sites of the country, the Bureau of Corporations has discovered an interesting and important state of affairs in Colorado. The situation is made more interesting by the fact that Ormsby McHarg, who recently resigned as assistant secretary of Commerce and Labor, denied while in office that there was any water-power trust. The Bureau of Corporations is a subordinate of the Department of Commerce and Labor.

The bureau has found that within an area of 50,000 square miles in Colorado, the General Electric and Westinghouse people absolutely control all the power which turns the wheels in the smelters and other industries, as well as that which lights cities

and town and runs street car systems. To use the words of the investigators:

"The Central Colorado Power Company now claims as its market an area from Grand Junction on the west to fifty miles east of Denver and 100 miles north and south of this line, an area of 50,000 square miles, a commonwealth in itself.

"In this area, this company, holding the best powers, with sufficient power already in process of development to supply the demand for years, and with its command of the market referred to, controls the territory for the present, but also for the future development as well, since there will be no possibility of equality of competition for future competitors either in meeting the cost of producing power or in obtaining equal marketing facilities."—*Boston (Mass.) Traveler*.



The National Rivers and Harbors Congress

The National Rivers and Harbors Congress held its sixth convention in Washington, D. C., on Wednesday, Thursday, and Friday, December 8, 9, and 10, in the New Willard Hotel. The occasion was in every way a notable one. The order of the addresses was high, the meeting was enthusiastic and determined. Following are extracts from a few of the more noteworthy utterances:

Count J. H. von Bernstorff, German Ambassador and Minister Plenipotentiary, said: "When one considers that the railways, in spite of the active inland navigation, have attained a favorable development, and that they are the most profitable in Prussia, where inland navigation is best developed, it is evident that a harmonious cooperation of waterways and railways is also profitable to the latter."

Hon. Joseph E. Ransdell, president of the National Rivers and Harbors Congress, said: "We must make the people who elect the congressmen and the state legislators understand that water transportation is much cheaper than rail for heavy, low-class, bulky articles. We must make them understand that a well improved system of canals and rivers, with standard depths along our seaboard and interior would furnish admirable facilities for moving freight and prevent the congestion which caused such heavy losses three years ago and threatens to recur. We must teach them that most of the terminals on the water-courses are owned by one or more railroads and used for selfish interest with scant regard for the public welfare.

"This situation will be changed as soon as the people demand it."

President William H. Taft said, in part: "You are going to encounter in Congress great opposition to the policy of issuing bonds right out of hand. You are much more likely to get from Congress a declaration of policy in the shape of a declaration that a certain improvement ought to be car-

ried out and spread upon the minutes of Congress in the form of a resolution or a declaration in a statute. What I advise you to do is to get that declaration. Then when the time comes that political exigency shall prevent the appropriation of sufficient money from the current revenues to put the proper part of the project through the coming year or the coming two years, as economy requires, the question of issuing bonds will arise. I would get the declaration first, and not have the bonds first, for the reason that you will encounter the objection by Congress that the issuing of bonds and the receipt of the money will develop a desire to be extravagant."

Mr. Herbert Knox Smith, Commissioner of Corporations, declared that "water terminals are an important factor in connection with river transportation.

"If any one will travel considerably on our inland waterways," he said, "he will perhaps understand why we do not hear of terminals. He will find that they are largely non-

existent there in any modern commercial sense, and where they do exist they are usually controlled by some exclusive interest."

Senator Theodore Burton, chairman of the National Waterways Commission, said: "The time has come when the individual project must be abandoned and a wise, comprehensive policy of waterway improvement substituted. Selfishness must be eliminated from the demands on Congress for appropriations, so that the entire country can benefit from a comprehensive development of waterways which would benefit individuals as well as the Nation."

Senator Burton said that he favored the issuance of bonds if there were not sufficient funds to complete a comprehensive policy adopted by Congress.

President Taft, in receiving the Ohio delegation, expressed his regret that his remarks before the Rivers and Harbors Congress had cast a wet blanket over the convention, and said that he only intended to help the gathering along by pointing out the practical method of accomplishing the object desired.

RECENT PUBLICATIONS

"Fourteenth Annual Report of the Forestry Commissioner of Minnesota, for the Year 1908"

This report, by General Andrews, is an especially interesting one. It contains a reprint of his special report, issued in December, 1908, on the forest fires of that year, which were exceptionally severe and caused a total loss of over \$2,000,000. It also contains a summary of new forest legislation enacted by the last legislature, which is a decided step in advance and will undoubtedly be of great value to the state. The new law provides for additional fire warden and ranger service with increased pay, and makes an emergency appropriation, not to exceed \$14,000 a year, for fire fighting. Additional precautions are taken to prevent the starting of fires from camp fires, and the minimum penalty for the violation of the forest fire law is made \$50. Every one cutting wood or trees for commercial purposes is compelled to burn the slashings as soon as practicable. The legislature also passed a tax of one-fifteenth of one mill on each dollar of taxable property to form a permanent fund to enable the state to purchase forest lands at a cost of not over \$3 per acre, and

to maintain forests on these. This amendment will be voted upon by the people at the next general election in 1910.

In addition to the regular report of the forestry commissioner, the publication contains a very suggestive article dealing mainly with nursery and planting work, by Mr. Knechtel, inspector of forest reserves for the Dominion of Canada. The usual sketches of forestry in European countries are also included, and many of these have been wholly revised or contain additional information.

S. T. D.



"Aids to Shippers, Oelrichs & Co., New York City."

This seventy-two page booklet is not of special interest to foresters, but contains much information of value to all engaged in the export and import trade. The table of foreign moneys with United States equivalents, together with weights, measures, tariffs, customs requirements, and similar information, will undoubtedly be of value to all who have occasion to refer to such matters. The book will be sent postpaid on request to the publishers.

S. T. D.

To the Members:

Your Board of Directors conclude their last annual report with the following:

"Inland navigation, deeper waterways, water powers, and economical manufacturing therewith, floods, soils, irrigation, drainage and the public health, as shown in detail by one of our folders, are all fundamentally dependent upon and related to Forestry. This larger field of conservation and utilization of all our natural resources plainly places upon our Association duties which should be heartily assumed, and diligently discharged.

"In closing, it should be said that, in comparison with the work remaining to be done, the work already accomplished by all the forestry forces combined is slight. Destruction of resources proceeds without abatement. Sentiment now developing should be intensified, and focused upon local, state and national governments, that legislation and administration may accomplish the ends without which all our efforts are vain.

"The American Forestry Association is a leading agency for general propaganda in this field. Its efforts are strictly limited by its means. Where it receives hundreds, it should receive thousands of dollars for the prosecution of the great work before it. For this arm of power it looks to its members. Their dues are practically its only resource. Each member may, however, enlist other members, and by so doing, render to his country a patriotic economic service of great value."

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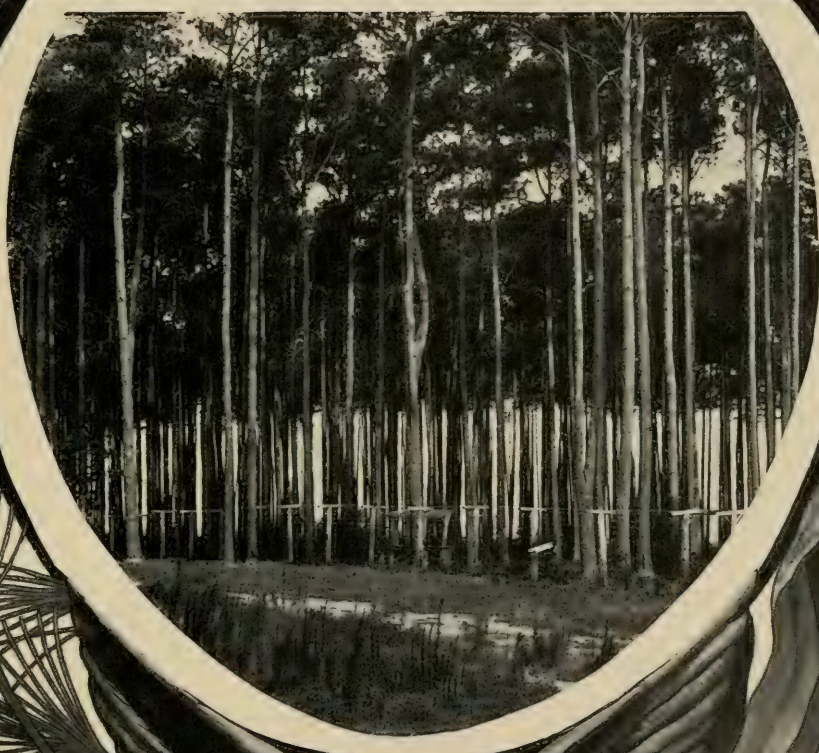
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American Forestry

The Magazine of the American Forestry Association

February

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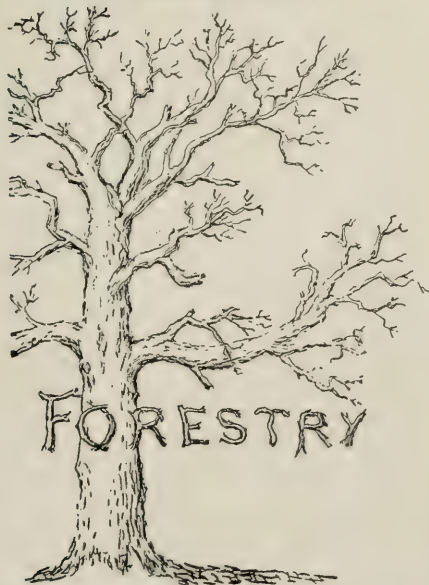
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FEBRUARY, 1910

No. 2

THE APPALACHIAN FORESTS

By HON. CURTIS GUILD, JR.

The President's Address at the Twenty-ninth Annual Meeting of the American Forestry Association

IN VIEW of the pending Congressional investigation in regard to the conservation of national resources, comment, eulogy or censure of the past would be not only in bad taste, but useless. It is extremely gratifying to note that all the officials connected with forestry in the National administration, in spite of all differences, agree on the urgent need of the immediate passage by Congress of remedial legislation in the cause of forestry and of conservation.

We are extremely fortunate in having at the head of forestry work in the United States a gentleman who is not merely earnest, energetic, and unselfish, but an acknowledged expert of international reputation on the subject of forestry. We cannot go far wrong in our course, while the chief forester is Prof. H. S. Graves, once of Yale, but now of the United States.

The advisability of protection for our forests is so universally accepted as to need no defense. I shall, therefore, devote myself to one specific act that is needed now, an act advocated on the broadest grounds of general good and openly opposed only on grounds of a most peculiar character as far as superficial developments have made them manifest.

We have every reason for gratitude to President Taft for his support of our appeal for Appalachian forest reserves. This association urges the acquisition of Appalachian forest reserves not merely as a measure of cruelly needed help for water supply and the public health, but as a matter of common justice.

Whether the money spent to preserve the forests on the water-sheds of the Appalachians comes as an appropriation from the National Treasury or from the revenues of the existing forest reserves in the western states, the East and South have a right to ask the same attention to their development at the hands of the National Government as has been already given to the West and with universal approval.

The opponents of the creation of Appalachian forest reserves at the hands of the General Government have given three specific reasons for their attitude. They claim:

1. Forest reserves do not promote regular stream-flow. Their creation, therefore, would be a useless expense.

The only authority for this mistaken statement is the opinion of an officer of the United States Army whose profession identifies him with military rather than with civil engineering. He



HON. CURTIS GUILD, JR.
President American Forestry Association

has been completely confuted by Prof. George F. Swain, the expert formerly of the Massachusetts Institute of Technology, now of Harvard University. The hostile opinion of the military engineering officer is in direct opposition to that of the entire force engaged under the Forester of the United States. It is in direct opposition to the experience of China, of France, and of Spain, where the denudation of forest-clad hills has led to a succession of freshets and droughts on what were once fertile slopes and, except where reforestation has taken place, has reduced the agricultural population that once tilled those soils by sweeping away the very soil itself.

Mr. James S. Whipple, forest commissioner of New York, very truly said in his address at Bretton Woods, N. H., last summer, of the forest as a national reservoir: "Without forests we can have but little water. A study of this natural reservoir proves the importance and imperative necessity of preserving our forests. Let us examine it: The trees are part of it; the leaves on the trees are part of it; the twigs, old logs, limbs, and fallen leaves are a part of it. All of these catch, delay, and hold back the rain-drops as they fall. If you will observe the conditions of the forest floor you will notice that between the trees there are little basins in the ground, caused by the roots of the trees holding up the soil. These basins catch and hold the rain. Then underneath it all, formed from decaying leaves, twigs, limbs, and logs for a thousand years, is a black mold called humus. This humus has greater power to take up and hold moisture than any other known vegetable or animal matter. Then the leaves, limbs, trees, the dead and decaying debris upon the ground, the little hollows or basins between the trees, and this humus are all parts of this perfect reservoir, built on nature's plan, detaining, holding, and keeping back the water, allowing it to soak into the ground to feed the little springs, thence the creeks, and keep the water flowing slowly from the hills all the year round.

"On the other hand, when the forest is cut away, the basins are broken down, all obstructions to the flow of water are removed, the humus is destroyed, and nature's reservoir is swept away, allowing the water to run quickly into the larger streams, causing destructive floods. Many times great damage and sometimes unhealthful conditions follow. When the storm is over, the flood subsides, the water is soon gone, and dry creek-beds appear.

"Last August the upper Hudson had no more than two inches of water where once it flowed deep and strong the year round. The water last August in Lakes George and Champlain was a foot and a half lower than ever before.

"More than 300 years ago France, in an evil day, permitted that which we are now permitting, to wit: the cutting off of all its trees, which left its hillsides and mountain tops uncovered. The agricultural lands were much injured; the water supply much reduced. It had no forest, the hillsides were eroded, the soil was washed away. Then a splendid man, realizing the enormity of the evil that had come to his country, started out on a campaign of education over France, urging the people to plant trees. Since then the French people have expended more than two hundred million dollars in trying to reforest their waste land, and they have more work yet to do."

The opponents of Appalachian forest reserves present as their second objection:

2. The acquisition of forest reserves by the National Government is unconstitutional,

Why?

The Constitution in terms was ordained and established to "promote the general welfare." If the establishment of a permanent source of timber supply, the preservation of water and of water-power, the drainage of cities, and the preservation of the public health, all of which are provided by the acquisition of forest reserves, do not make for the promotion of the general welfare, what in heaven's name does make for it?



Larch Timber on the Edge of a Clearing

Plenty of constitutional authority was found for the Louisiana purchase and for the Gadsden purchase. Nobody questions the constitutional right of the United States to buy land for fortifications, for custom houses, for post-offices, or for navy yards.

Nobody questions the constitutionality of national enterprises, even of a national loan of millions of dollars for the promotion of inland waterways for the middle West, or for national irrigation enterprises for the far West.

Nobody questions the constitutionality of spending the national revenues for the maintenance of forest reserves in the West, in the benefit of which the East does not participate. If it is constitutional to maintain forest reserves for the Pacific slope, it is hard to see by what process of reasoning it becomes unconstitutional to acquire forest reserves for the Atlantic slope.

Finally, driven from these two untenable positions, the opponents of Appalachian forest reserves have at last taken up a third argument:



First Connecticut Lake, New Hampshire. Effect of Constant Flooding for Storage



The Pine Forest



Heavy Spruce Timber, Mad River, New Hampshire



Logged Yellow Pine With Young Growth Left Standing. Fire Protection Absolutely Necessary

3. The separate states in which forest reserves are proposed should pay for them out of their respective state treasuries.

The answer to this statement is that, with the exception of New York, and one of two others, the states separately cannot afford it.

One of the most needed of these reserves is in the state of New Hampshire, about the headwaters of many of the great rivers of New England, already shrunk in volume, already damaged as a result of the neglect by a National Government that has been lavish in its expenditures to save woods and water-power and water supply for the states beyond the Mississippi. The little state of New Hampshire cannot afford, with her small population and rocky soil, to buy and manage such a reserve.

The Nation, however, out of taxes, to which New Hampshire contributes, has maintained National Forest Reserves of 25,605,700 acres for the rich state of California alone, and last year added 2,364,483 acres to the National Forest Reserves located in that state.

If it be said that these forests are part of the National domain, it may be answered: Was it not the whole Nation that paid for the National domain?

California and her citizens receive the direct benefit of these forests. New England does not. It was not California alone that paid the bills of the war with Mexico. The support in California, led by one of her governors, of Appalachian reserves shows that Californians themselves appreciate that such a course is not merely generous, but just.

There are altogether 194,505,325 acres of National Forest Reserve. They are cared for by fifteen hundred National Forest officers. The total National appropriation for last year was \$3,908,249.32. These forests yield a revenue, and though these reserves were provided at the cost of all the states, the distribution to the states, one-quarter of all the gross revenues of the National Forest Reserve, goes only to the states in which these existing forest reserves

are located. The amount handed over by the National Government to such state treasuries last year was \$444,379.

The states and territories in which there are now National Forest Reserves are Arizona, Arkansas, California, Colorado, Florida, Idaho, Kansas, Michigan, Minnesota, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming.

Not one state of the old thirteen that fought the Revolution is benefited directly by these reserves—not one state that helped to pay for the Louisiana Purchase is directly benefited by these reserves—not one state that fought the war of 1812 is benefited directly by these reserves—not one state taxed to pay the bill for the cession of Florida by Spain is benefited directly by these reserves.

Yet none of these states, now neglected in this respect by Congress, grudges the present expenditure or regrets the treasure of blood as well as money so freely given in the past. Nor would this comparison now be made were it not for the claim that the separate states, not the Nation, should now pay for new reserves.

No existing National Forest Reserve has been acquired and paid for, none is even now exclusively maintained, by the people of any state or states directly benefited by it.

The forest reserves in Wyoming and Oregon are in the very strip of land granted by the King of England to the colonists of Massachusetts Bay. The claim of England to them was drowned in the blood of Lexington and Bunker Hill and the states themselves exist today as Wyoming and Oregon in part because Massachusetts relinquished her claim to these lands and give them to the Nation.

Washington is American and not Canadian because a Massachusetts sea captain beat Vancouver on a voyage of discovery and named the Columbia River after his ship. Idaho and Oregon, Montana, Wyoming, the Dakotas and Oklahoma and the National domain and forest reserves therein were not

paid for out of local treasuries at the time of the Louisiana Purchase, but out of the National Treasury, which the states of the Atlantic seaboard exclusively had helped to fill.

New Mexico, Arizona, Utah, Nevada, and California came into the Nation as the price of the blood shed during the war with Mexico almost entirely by soldiers drawn from the South and East. The money taken from the National Treasury to pay the bills of that war had been put there by the very states which certain sectionalists now say should be deprived of any attention on the part of the National Government.

It is true that the extensive forest reserves in the West were taken out of the National domain, but who paid for the national domain, and reserved these lands for the local benefit of the new states? Was it not the very states who then composed the Union, the very states whom the new sectionalism would now cut off from receiving a small part of benefits such as they have been given.

The West is asking wisely and rightly for National expenditure for irrigation which directly benefits not a single eastern state. Not one eastern newspaper has been so mean or so narrow as to suggest that the individual states that directly benefit by it should pay the bill. The states of this Union are supposed to be united, and the Atlantic slope gladly sees its burden increased by the diversion of one source of National revenue to the removal of the deserts in any part of our common country.

Is this a time for the West to refuse the East when the East, in her turn, asks National help that stream-flow and water supplies shall be preserved for the East through National Forest Reserves, as they are being created for the West by National expenditure for irrigation?

This is one country. The South today strikes hands with the North on this question of forest reserves and agrees to the square deal. The West has already received from National expenditure forest reserves. It is seeking more expenditure out of the Na-

tional Treasury for permanent water supply for its arid plains. It is unbelievable that any great body of men or newspapers in the West will permanently deny to the South and North equality of consideration and treatment.

All parts of the United States equally deserve National attention. As the protection of our coasts demands a Pacific, a Gulf, and an Atlantic fleet, so the conservation of our National resources, if it is to be promoted in Colorado, California, and Alaska, should be promoted also in the Carolinas, in Virginia, in New Hampshire, and in Massachusetts.

Whatever develops any part of our country is for the benefit of every American. The states that are asking for Appalachian Forest Reserves are merely asking for themselves what they have already gladly helped to give others. For the first time in our history the governors of South Carolina and of Massachusetts have stood side by side before the committees of Congress in this appeal for simple justice and common equity.

If the maintenance of National Forest Reserves is a wise National policy, that policy should be indeed National and no longer sectional in its scope. The first American army assembled under the pine-tree flag at Cambridge. The first American navy flew the pine-tree flag of New England. To-day the men from under the pine and palmetto stand together as they stood in those earlier days when the southern riflemen followed Morgan to the siege of Boston, as they stood when northern infantry followed the Rhode Island blacksmith to fight in Georgia and the Carolinas, beside Marion and his men, against a common foreign enemy.

We turn to our brothers beneath the shade of the button-wood, the willow, and the redwood and in memory of the flag under whose folds Americans first joined in uprising for a common country, we ask protection for the tree that was the first emblem of our liberty—we ask justice; not favoritism, but even-handed justice alike to the land of the palmetto and the pine.

FOREST PROBLEMS IN THE PHILIPPINES

By BARRINGTON MOORE, M.F., United States Forest Service

I—INTRODUCTION

IN THE present movement for conserving our natural resources, too little attention has been paid to those of our most important possession, the Philippine Islands.

In the short space of this article, an attempt will be made to give some idea of the forest conditions, the problems which confront the forestry bureau of the islands, and what has been done and is being done to solve these problems.

II—THE FOREST

Up till very recently the conception of the Philippine forests held not only popularly, but by the better-informed people of the islands, was an altogether erroneous one. The belief was that they were made up almost entirely of a large number of different species of trees, most of which would yield a beautiful, hard, heavy wood, of great value in furniture making or cabinet work. This idea probably came from the fact that under Spanish occupation such woods were naturally enough the first, and practically only, ones to be used, and that wood dealers attempted to make the public believe that such woods were the regular product of the Philippine forests. This misconception has done considerable harm to the reputation of these forests, in that when people begin to find out that such valuable woods are really rather scarce, they think that the wealth of the forests has been greatly overrated and that they are not really worth anything at all. The fact is that the forests are mostly made up of soft woods of the Dipterocarp family, the proportion being

seventy-five per cent Dipterocarp to only twenty-five per cent hardwoods. Although not as valuable as hardwoods, these Dipterocarp are far easier to utilize and a good deal more useful on the whole. Though generally known as softwoods, they vary a great deal in hardness, from Giujo (*Shorea Guiso*), which is somewhat harder than our Elms, to the Lavans, which are about as soft as our Tulip or Yellow Poplar (*Liriodendron Tulipifera*). On account of their abundance and the ease with which they can be worked, both in logging and sawing, they are destined to form the bulk of the lumber supply of the Philippines for ordinary construction purposes. They will be to the Philippines what the Conifers are to the United States. Not only should they form the bulk of the lumber of the Philippines, but under proper management and utilization, they should be able to supply the lumber markets of most of the far East.

For an idea of these forests, a brief description of the one on Northern Negros, in which the Insular Lumber Company have a concession, will be given. This forest is fairly typical of the Dipterocarp forests of the islands, though perhaps the moisture conditions are a little more favorable, on account of the absence of a distinct dry season such as is found in other parts of the islands, and the stand per acre somewhat heavier than the general run. Of the trees of over twelve inches in diameter at breast height, ninety per cent are Dipterocarps of six species. The two commonest and most important, forming the bulk of the forest on the flats and lower slopes, are Red Lavan (*Shorea* species, will probably be called *Everetti*) and Almon Lavan (*Shorea*

species, possibly *Furacæ*). Also of great importance are Apitong (*Dipterocarpus Grandiflorus*) and Tanguile (*Shorea Polysperma*), the former being found in groups on almost all situations up to about 2,500 feet, the latter as scattered individuals above 700 feet elevation.

In addition to these, there is Bagtican Lavan (*Parashorea Plicata*) and White Lavan (*Pentacma Contorta*, also called *Shorea Contorta*), neither of which occurs in large enough quantities to be of much importance. These trees all grow to large sizes, with great, spreading buttresses, but clean and cylindrical stems for great heights above the buttresses. Thus they have an excellent form for sawing, and yield lumber which is especially characterized by the practical absence of knots. They would average approximately thirty-three inches in diameter above the buttresses by 100 feet or more in clear length, trees of five feet in diameter above the buttresses and 120 feet clear being not uncommon. The average volume per acre, from an estimate made by the Bureau of Forestry, is 50,000 board-feet, of which, unfortunately, about thirty-five to forty per cent is unsound on account of the large number of over-mature trees.

The most striking feature of the forest, from a silvicultural point of view, is its uneven-aged character, with the trees of different ages so evenly distributed that all ages would be represented on a sixteenth of an acre, instead of tending to form groups, as in most uneven-aged forests, except those in text-books. The canopy formed is complete.

The undergrowth is chiefly creeping bamboo, Bejuco (the rattan of commerce, and extremely useful in a hundred different ways); an *Oncasperma* species (a cane with spines), *Pinanda* (a small palm), *Palma Brava* (*Livingstonia Whipplei*), reaching a height of sixty to seventy feet), and a number of other palms and canes. Although fairly thick in places, it is nowhere as dense as the tropical undergrowth of the popular imagination. It

can easily be penetrated anywhere with little or no cutting.

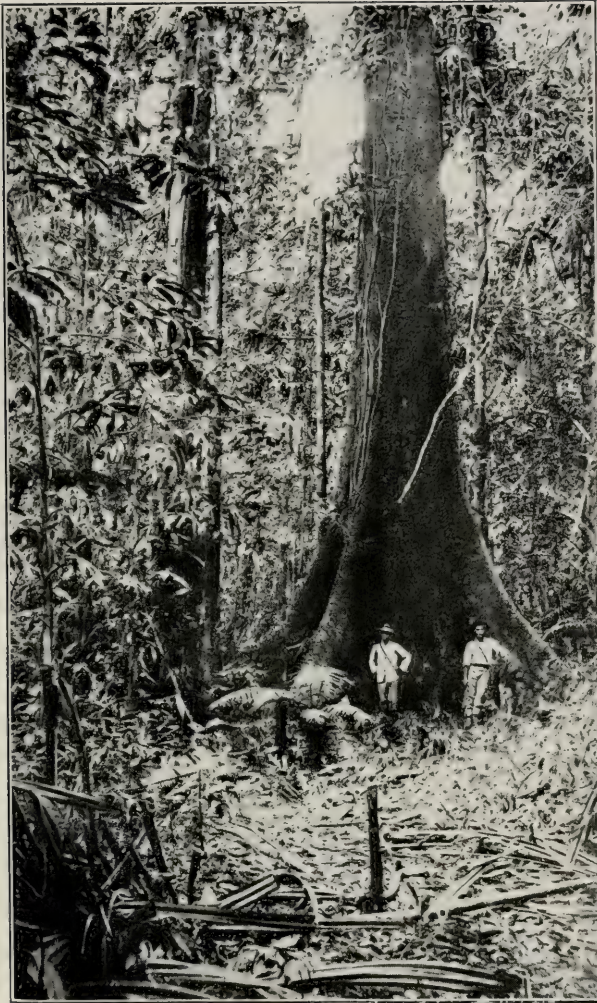
The forest floor is almost free from weeds and is covered with a very thin leaf litter. There is no mat of partly decomposed leaves as in a temperate forest, and no layer of humus. The soil (a clay, with about twenty to twenty-five per cent sand), is fresh to moist, and is thoroughly mixed with a large proportion of humus, which keeps it in excellent physical condition.

All this is due to the extremely rapid forces of decay, on account of the abundant heat and moisture. Thus we have a combination of factors which make as perfect conditions of growth as can be found anywhere in the world. It is believed by the chief of the Branch of Investigation that trees reach three feet in diameter within less than 100 years in this forest.

The principal types are briefly as follows: On the flats and lower slopes we find chiefly Red Lavan and Almon, mixed with Apitong, this last occurring somewhat in groups on account of its more light-demanding nature. From about 800 to 2,500 feet elevation, Tanguile comes in and, though scattering, is so common that it forms the key-tree of the type. Red Lavan, Almon, and Apitong are also abundant. On this type, at about 1,800 feet, we begin to get a layer of humus about an inch and a half thick, just as in temperate forests. The trees here become shorter boled.

Above 2,500 feet to about 3,000 feet, we find a number of smaller, short-boled, crooked trees, chiefly of the family of *Ericacæ*, of no commercial importance. Among them occurs the tree fern, a picturesque survivor of a family widely distributed in a former geological period. Here we find a thick layer of moss covering the forest floor.

Above 3,400 feet to the top of the mountains at about 5,200 feet, practically the only tree is the Cypress (*Dacrydium* species, belonging to the *Taxacæ*). This is so crooked and gnarled and so thickly covered, even to the ends of the branches, with moss in which bushes and even its own seed-



A Typical Large Almon on the Flat Type,
Showing Large Buttresses

Insular Lumber Co. Concession, Northern
Negros (see page 75)



A Good Stand of Dipterocarps (Mostly
Almon and Red Lavan) from Which the
Undergrowth Has Mostly Been Cleared
Out. Note Man in Lower Middle of
Picture

Insular Lumber Co. Concession, Northern
Negros (see page 76)

lings are growing, that it is hardly recognizable as a tree. There is no soil except in an occasional hollow, but the thick layer of moss which covers everything acts as an ideal retainer of water. These last two types, on account of their mossy character, form the most perfect protective forest imaginable.

Thus the main characteristics of these forests are the abundance of large timber trees, the remarkably favorable conditions of growth, and their great value for protection on the higher slopes.

III—THE PROBLEMS

The first problem to strike the outside observer is the lack of knowledge as to what there actually is in the forests. Under Spanish rule there had been no proper study made of the flora of the islands or of the different woods. When the islands were acquired all this vast work, which means far more in a tropical country, on account of the greater luxuriance of vegetation, than people living in a temperate country can realize, remained to be done. Not only is little known about the species and woods, but even the actual location and extent of the commercial timber of the islands is still to a certain degree a matter of conjecture.

The most difficult problem, however, is the Land Question, involving, as it does, the relation of the forests to the population and the settlement of the land. Some idea of the importance of the rôle played by the Bureau of Forestry in the solution of the Land Question may be obtained when it is considered that the Homestead Law requires that any piece of land, before being entered, must be certified to by the Bureau of Forestry as being more valuable for agricultural than for forestry purposes, and that there was a movement on foot last year to place the Bureau of Lands under the Bureau of Forestry.

The first phase of the problem, supplying the needs of the people for firewood and building material, is comparatively simple.

The second phase, the settlement of the land, is difficult in the extreme, involving the treatment of Caingins, Cogans, and Homesteads. Caingins are a system of shifting cultivation practised in forest lands, which is destructive and wasteful in the extreme. To make a Caingin, the Filipino moves into a body of fine virgin timber and begins by cutting all the undergrowth. As soon as the undergrowth has lain on the ground long enough to dry out he fells all the trees. Then he sets fire to the area. This burns the undergrowth, but merely churns the stems of the larger trees. The result is that the ground is covered with a network of huge fallen trunks. In such spaces as he finds between these trunks, the Filipino plants a haphazard crop of gabi (a kind of edible root), corn, or tobacco. He makes no pretense of plowing, or even scratching the ground, but merely pokes a hole with a stick and puts in the seeds. Neither does he attempt to keep out the weeds. The result is that within a couple of years the area is so overgrown that it has to be abandoned. He then moves on and destroys another valuable piece of forest. At Port Banga, on the Island of Mindanao, it is estimated that from \$75,000 to \$100,000 worth of timber was destroyed by Caingins in a single year. The abandoned Caingin, if fire is kept out, will be covered with a growth of small, inferior tree species, under which, in the course of time, more valuable species will seed in if there are any seed trees in the neighborhood. If fire gets in, it gives the grass a chance against the trees, and, as successive fires occur, the grass becomes more and more firmly established until we get the regular Cogan, or waste grass land. It has been estimated that this Cogan, which is at present absolutely useless, forms thirty per cent of the total area of the islands.

One would naturally ask: Why does not the Filipino cultivate this Cogan instead of making a Caingin? The reason is two-fold: In the first place, because the grass is rather hard to eradicate without cattle, and cattle are rather

Forest at 700 Feet
Elevation, Showing
Character of Forest
Floor and Under-
growth



The Tall Palm Reach-
ing to the Top of
the Picture in the
Background is the
Palma Brava (*Liv-
ingstonia Whip-
cordii*). Northern
Negros (see page 76)



A New Caingin With a Crop of Gabi in Between the Felled Tree Trunks. Northern Negros (see page 78)

scarce since the rinderpest swept the islands a few years ago. On account of his aversion to the harder kinds of manual labor, he prefers making a Caingin in the forest to cultivating the Cogan by hand, because making the Caingin is somewhat easier. In the second place, all the Cogan land, though uncultivated, is claimed by some Cacique (prominent Filipino villager) or other. So that, even if a man should have the energy to till it, the Cacique would come along and seize the crop, though he has no valid rights to the land and cannot cultivate it himself. The injured man is, of course, too poor to take the matter into court.

There is a law against making Cain-gins, but so far the Bureau of Forestry has not only not been supported by the government in its attempts to enforce the law, but has *actually been prevented* from doing so. In a certain case on the Island of Negros, the forester in charge had discovered a large number of Caingins and had secured all the evidence necessary to convict the Caciques who were back of the Caingin makers. He was about to press the case and secure conviction, when orders came from headquarters to drop the matter entirely.

As regards the clearing up of all the invalid claims of the Caciques to the Cogan land, the government has done absolutely nothing.

Another phase of this difficult land problem is the making of a proper survey of the islands. This would greatly facilitate the solution of the whole matter.

It will be necessary, then, to regulate the taking up of homesteads. So far, homesteads have been for the most part nothing but mere Caingins.

We next come to the problem of utilizing the forests. The difficulties of cutting in such a way as to get a second crop can be realized when it is remembered that absolutely nothing is known of the silvicultural requirements of the species to be dealt with. Under the circumstances, it would be advisable for the future welfare of the forests, to go slowly until more is

known about how they should be treated. Unfortunately, this is impossible, because the bureau is under the necessity of producing revenue so as to justify its existence. Hence, it must try to give as many concessions for working the forests as it possibly can. And, to make matters worse, these concessions must be given on ruinously favorable terms: at extremely low stumpage rates (unfortunately fixed in the forest act), and for long periods of years (twenty at least). Otherwise, nobody will embark on such a new and untried venture.

At present, all the forests of the islands belong to the government, much as the public domain in the west of the United States. Without boundaries, this makes entirely too indefinite and unwieldy an area to properly manage and protect. The problem, then, is how to create reserves so as to concentrate the work. The preliminary steps in the solution of this problem involve the enormous task of mapping the whole islands, so as to show the amount and location of bodies of commercial timber, the second-growth forest, the Cogan (grass land), and agricultural lands. Then a popular campaign will have to be carried on to obtain the support of the commission and of the people. When all this has been accomplished, the actual fixing of the boundaries of the reserves will give rise to the much disputed question of agricultural *versus* forest lands. Because there are some fine forests on land which is really fit for agriculture, but which, with the present development of the islands, will not be needed for settlement for a number of years to come.

The next problem will be to recruit and train an efficient force of rangers and guards to care for the forests. This will be a rather difficult matter, because of the dislike which the ordinary native has for that kind of work. Forest work is too hard for him. When he has acquired the amount of training required of a ranger, he thinks he is fitted for some easier position.

Lastly, the forest act itself will have to be amended. At present it places the



A Caingin After Being Used Three or Four Years; So Grown Up With Weeds as to Be Abandoned
Northern Negros (see page 78).

woods into four groups, according to the antiquated Spanish classification; and *fixes the price* for each group without regard to market or lumbering conditions. This is bad not only in itself, but sows the seeds of future trouble, because these groups and prices are things which must be continually changed, and in doing so the whole act must be changed. This makes the whole forest policy of the islands unstable. The act should fix the principles and leave the details to the Bureau of Forestry.

To summarize, the problems are as follows:

1. The description and classification of all the species found in the islands is estimated to be about 3,000 in all. This is work requiring a systematic botanist of the highest ability.

2. The investigation of the properties and uses of a large number of woods, until now practically unknown.

3. Silvicultural studies of the more important trees.

4. Solution of the relation of the forests to the population and the settlement of lands. This involves: (a) Supplying the needs of the local population for

firewood and building material; (b) the prevention of Caingins (an extremely wasteful and destructive system of shifting cultivation practised in the forest); (c) the treatment of Cogan (unproductive grass land resulting from the Caingins) and the settling of the invalid claims of the Caciques (prominent Filipino villagers) to this Cogan land; (d) getting a proper survey of the whole islands; (e) the proper regulation of homesteads.

5. The question of opening up the forests in such a way as to injure them as little as possible. This must be done immediately in spite of the present lack of silvicultural knowledge.

6. The establishment of forest reserves, so as to concentrate the work of management and protection. Fixing the boundaries of these will bring up the disputed point of agricultural *versus* forest land.

7. The development of an efficient force for managing the forests.

8. The amendment of the forest act, so as to lay down the *principles* and leave the *details* to the Bureau of Forestry.

FORESTRY BEGINNINGS IN VERMONT

By AUSTIN F. HAWES, State Forester

IN OUTLINING the forestry policy of any state, the first thing to consider is, of course, the prevention of fires. My first consideration in starting here was therefore to determine just how serious the fire question is in the state and what measures seem wise to adopt. This study has convinced me that Vermont is one of the most fortunate states of the northeast in regard to forest fires. The topography and character of the forests are chiefly accountable for this situation, for there are in the state no immense, uninterrupted forest areas corresponding to those of Northern Maine or the Adirondacks. Agricultural lands and rivers divide the forests into blocks. While spruce is the chief timber of the state, it usually occurs mixed with hardwoods and these forests are less susceptible to fire than pure soft woods. Only in the Champlain and Connecticut valleys are there any dry sand plains, and these are neither extensive or within reach of a dense population as are those of Eastern Massachusetts and Southern New Jersey, where fires are so regular. Railroads are responsible for a small proportion of our fires, for, with the exception of the few cuts through the Green Mountains, they extend through agricultural river bottoms. In years of ordinary rainfall the state is almost exempt from fires, but during the exceptionally dry seasons, spring of 1903 and the fall of 1908, when all of New England and New York were shrouded in smoke, Vermont suffered its share of damage from fire. These fires were almost wholly in the larger forest blocks of the Green Mountains and were due rather to carelessness of choppers, hunters, and brush burners than to railroads, which seem to have

been the chief cause in New York and Maine.

The legislature of 1904 provided that the first selectman of each town act as fire warden, and in the eight unorganized towns that wardens be appointed by the Forest Commissioner. This official has now been superseded by the State Forester. Although it is one of the maxims of the forestry movement that combining the work of fire warden and selectman is poor policy, I believe that the exemption of three-quarters of the towns from these fires makes it inadvisable to try to change the law, especially when the delicacy of detracting from the prerogative of the selectman is taken into consideration. The apparent special danger of certain sections, however, suggests additional legislation which shall give the State Forester authority to appoint district wardens in certain towns who shall nominally be under the selectmen, but practically be responsible to the State Forester.

Opinions as to the value of the watch towers built in Maine have thus far been so varied that none have yet been constructed in Vermont. As there is comparatively little danger except in times of serious droughts, their value for Vermont seems problematical, as the air is then so full of smoke as to render them useless.

Instead of sharing the expense of fighting all fires with the towns, the state pays the balance when the cost exceeds five per cent of the grand list of the town. In this way the poor, uninhabited towns receive the greatest help. During the bad fire season of 1908 the state came to the assistance in this way of twenty towns, paying in all about \$6,000. The greatest amount



Plantation of Norway Spruce Thirty-two Years Old on the Billings Estate Woodstock, Vt.

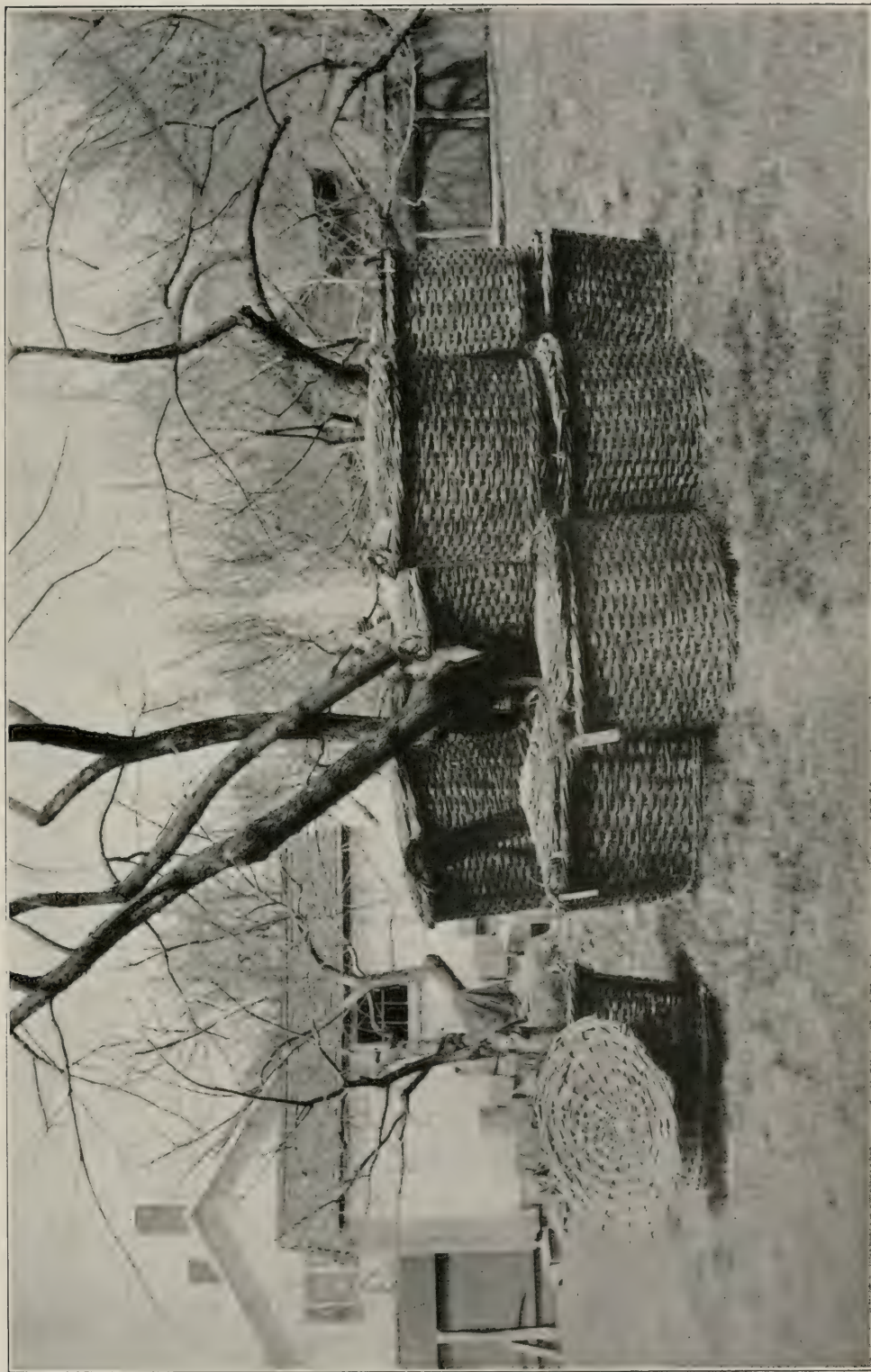


Spruce Roots Laid Bare by a Ground Fire Which Destroyed the Duff

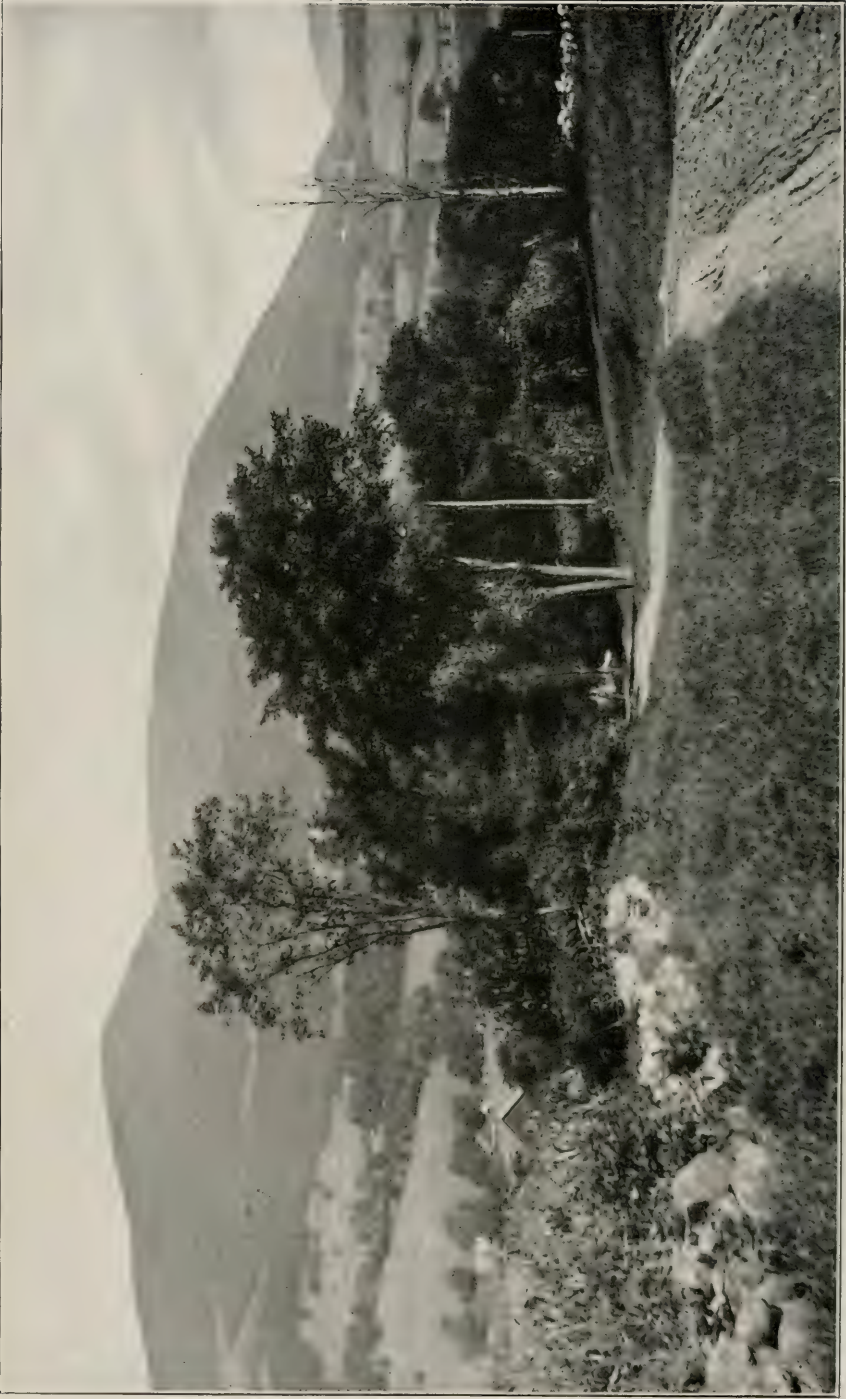
paid by the state to any one town was \$1,459, against a total cost for fighting fire in the town of \$1,608. While the state paid about ninety per cent of the cost to this mountain town, the total paid to these twenty towns was sixty-six per cent of the whole cost; while, of course, other towns which had but slight expense received no aid.

The main thing necessary in regard to the fire problem is, therefore, to enforce the law which we already have. On entering office I wrote to all of the state attorneys (there is one for each county), calling their attention to the necessity of prosecuting offenders under the fire laws. Only one serious fire has been called to my attention this year. Evidence was at once secured by this office and within three weeks the state's attorney for the county had secured a conviction, which resulted in the guilty party paying a fine of \$10 and costs, amounting to \$25 in all.

That state forestry work must for some time be largely educational is undoubtedly the reason that it appeals to such a limited group of foresters. Interest in the subject in Vermont had been so thoroughly aroused under the leadership of Professor Jones and the State Forestry Association that the field is much more encouraging than in a state like Connecticut, where interest is primarily in city affairs. As evidence of this greater interest, which is undoubtedly due partially to the general progress which forestry has made during five years, may be mentioned the fact that during my first six months in Connecticut not a single invitation for an address on forestry was received; while during a similar period in Vermont I have given eighteen addresses before farmers' granges, women's clubs, teachers' associations, librarians' conventions, church societies, etc.



Baskets in Which Forest Seedlings Were Imported from Germany for Distribution in Vermont



Equinox Mountain, One of the Innumerable Forest-clad Mountains of Vermont

Five years' experience in propaganda work has convinced me that the only way to get any real results from this educational work is to advocate some specific line of work. Planting is the one phase of forestry which interests the average lay mind. While it is the least important branch in the East and the least interesting to the forester, it does furnish a handle by which to get a great many people actively interested in forestry work. When a man has once planted a thousand trees he will protect them from fire and begin to study their growth. He soon notices natural reproduction, and it is only a step to more conservative cutting. The leaders of the forestry movement in Vermont realized the educational value of planting and secured in 1906 an annual appropriation of \$500 for five years for a forest nursery, following the precedent started by Connecticut of selling forest seedlings to land owners at cost price. With the increased appropriations available this year, the nursery has now been extensively enlarged, so that we now have a total growing stock of about 1,500,000 seedlings. The past spring we sent out to land owners 200,000 trees, mostly white pine. The encouraging feature of this is not the number, but the fact that they went to every county in the state, and to over seventy different people, of whom at least ten are lumbermen, and as many *bona fide* farmers.

In Vermont the general movement is now gaining headway—how effectively, we cannot say—to reorganize the rural schools with the purpose of fitting the pupils for life in the country rather than in the city, which has formerly undoubtedly been the tendency of all education. Vermont must always remain primarily an agricultural and forest state. The sooner we can instil into the young new ways of looking at the forest, the sooner will forestry ideals be realized. By this we do not mean a sentimental regard for the forest, but a knowledge of the laws underlying forestry, so that the forests will be managed in the future as a crop and not as a mine. As a first step toward cooperating with the more progressive teach-

ers in their desire to incorporate these new ideals, we supplied the past spring a limited number of "Arbor Day packages" with detailed instructions for use in a bed eight by two feet in the school yard. These packages contained seedlings of various ages of white, red, and Scotch pine, and Norway spruce; and small papers of white pine and locust seed. A charge of 50 cents was made for the package.

No event is so much anticipated in rural communities as the agricultural fair, a series of which is held every fall in all our eastern states. Our legislature has finally recognized their value by appropriating money for a state fair. Besides this state fair, there were ten corporation fairs in Vermont this fall. These have an average daily attendance of from four to fifteen thousand people coming from the most remote parts of the state. At most of these fairs the state forest service this year had an exhibit consisting of several boxes six feet by one foot by six inches, containing various kinds of forest seedlings; bottles of tree seeds, and sections of Norway spruce trees grown in Vermont showing very rapid growth. The interest in these exhibits was entirely beyond our expectation. One and sometimes two attendants were kept constantly busy from morning until night explaining the exhibits and answering questions on all phases of forestry.

That the people of the state are fully awake to the importance of the forestry movement their interest at these fairs demonstrated. The press of the state has also shown an unusual appreciation of the importance of the work, and the state forest service has been particularly fortunate in this progressive attitude of the press.

The annual appropriation available for forestry purposes is now \$8,500, and we hope soon to acquire some lands for state forests which will be purchased primarily for educational purposes. Later on I hope that the state will enter upon the policy of acquiring large tracts in the Green Mountains. In no state, I believe, is there a more sane and thorough interest in forestry to-day than in Vermont.

A NEW CYPRESS FOR ARIZONA

By GEO. B. SUDWORTH

Dendrologist, Forest Service, U. S. Department of Agriculture

APPROXIMATELY nineteen species of cypress are now known in the world. Eight species occur in the United States. Five of these grow in the Pacific region, two in our Southwest, and one species in the South Atlantic and Gulf Coast region. The others inhabit Mexico, Lower California, eastern Asia, portions of the Himalayas, eastern Mediterranean countries, and southeastern Europe. They are trees of very ancient origin. Remains of them have been found in the tertiary period of the earth's history in Greenland, while subsequently the cypresses appeared in western Europe, in which, however, they are not now represented.

All of the cypresses (exclusive of *Taxodium*) are grouped either under the genus *Cupressus*, or divided between this genus and *Chamaecyparis*. The true cypresses belong properly to the genus *Cupressus*, and comprise the species found in Lower California, Mexico, Arizona, California, southwestern Asia, China, the Himalayas, and southeastern Europe. This group of cypresses is characterized by large, thick-scaled fruit, which matures in two years, and produces numerous wingless seeds. The remainder of the cypresses, which may be included under the genus *Chamaecyparis*, differ from the true cypresses in having very much smaller fruit, which is matured in one* season, and produce only a few seeds with thin papery wings.

The cypresses important for their timber are our Pacific Slope species, the Lawson Cypress and "Yellow Cedar," the White Cedar of the Atlantic region,

two Japanese species, the Himalayan Cypress, and the Pyramidal Cypress of southeastern Europe and southwestern Asia. The latter Old World species (*Cupressus sempervirens*) has doubtless been known longer to civilized people than any other cypress. It does not exist now in the wild state, being preserved only in cultivation. The ancient Romans carried this cypress from Greece to Italy where they planted it extensively. The exceedingly durable wood is said to have been used by the Egyptians for mummy cases, while the doors of the Roman temple of Diana and the statue of Jupiter are believed to have been made from the wood of this cypress.

Up to the present time but one cypress, *Cupressus arizonica*, has been known to inhabit Arizona. It occurs mainly on the Santa Rita, Santa Catalina, and Chiricahua mountains. It is also said to occur on the extreme eastern part of San Francisco Mountain. Careful explorations are yet required to definitely outline the range of this species, which was discovered as recently as 1882. This cypress is characterized by a rather thin, somewhat stringy, anastomosing furrowed bark of dark red-brown color.

In strong contrast with this rough-barked character, is the perfectly smooth bark of the cypress recently found by the writer on the north slope of Verde River canyon in Yavapai County, Arizona, and for which I propose the name *Cupressus glabra*. The trunks have throughout a very thin, smooth, dark purple-red bark. Each year's growth of bark (from about one-

*Our so-called "Yellow Cedar" (*Chamaecyparis nootkatensis*) may prove an exception to this. Trees planted in England are said to show a biennial habit of fruiting, but convincing proof of this is still lacking. Further careful studies are being made of this and other members of this group in order to settle the doubt, recently raised.



Cupressus Glabra

sixteenth to one-eighth of an inch thick) breaks up into small, curling plates, which on all vigorous trees fall away during the succeeding late autumn and winter. The tree attains a height of from thirty-five to fifty feet and a diameter of eighteen to twenty inches. It is probable that considerably larger trees occur. The branches, particularly of younger trees, are strongly upright and form a compact, narrowly oval or somewhat pyramidal crown. Old trees, grown in the open, develop long lower branches which, from their great weight, are often much less upright

than in old trees in a dense stand. The spherical mature fruit is from about seven-eighths to one and one-eighth inches in diameter, and composed commonly of six (exceptionally eight) scales. The scales are armed with conspicuous, incurved, somewhat flat-pointed, bosses. The matured cones are smooth, but conspicuously wrinkled and covered with a deep, blue-gray bloom which, when rubbed off, reveals a rich, dark brown color; very old cones are ashy-gray. Cones of one season's growth, also smooth, are often light reddish-brown, but with areas of pale

bluish bloom. The cones are borne on stout stems from one-fourth to one-half an inch long. Ripened cones remain unopened on the branches from fourteen to eighteen years, possibly even longer, the seeds being retained during this period. To what extent the seeds preserve their vitality during this time is at present unknown to the writer, who has not yet had an opportunity of testing these old seeds. The red-brown seeds vary in form from a triangular to a rounded and somewhat rectangular shape. They are from three-sixteenths to five-sixteenths of an inch long, the larger dimensions being more common. The foliage has a bright blue-green (glaucous) aspect due to a pale bloom on the leaves. The leaves on old sprays are (about one-sixteenth of an inch long) closely pressed to the twigs, acutely pointed, thickened and keel-shaped on the back, and nearly all bear a resinous pit (gland) on the back. Young shoots bear closely pressed leaves from one-fourth to one-half an inch long, but with very keen spreading points. The leaves die during the second year, turn a bright red-brown and remain on the twigs for about four years; later the twigs and small branches become ashy-gray. Male flowers are abundant, but as yet the female flowers have not been discovered.

The wood of this cypress is exceedingly durable in an unprotected state; even the sapwood has great durability exposed to weather and soil. Cabins built of the logs forty years ago are still in a good state of preservation, while fence-posts and corral poles show but little decay after twenty years' exposure. Marked durability of this wood is in contrast with the wood of *Cupressus arizonica*, which is not particularly of lasting quality. The sapwood of *C. glabra* is a pale straw-color and the heartwood is a very light brownish

yellow. The wood is hard, heavy, usually very fine-grained, and when freshly cut it has a slight cedar-like odor.

As known at present *Cupressus glabra* ranges from an elevation of about 3,700 feet to 5,500 above sea level. The Verde Canyon forest is about six miles long and about one and one-half miles wide. The trees are associated more or less at lower elevations with *Pinus monophylla*, and *Quercus chrysolepsis*. Higher up, except in the drier areas, the cypress forms the principal tree-growth. It chooses a north slope entirely, growing best in protected watered gulches and on the sides of shallow canyons, but it occurs also on the intervening benches and ridges where the shaley soil is moist.

Unquestionably this cypress will later be found to have a much wider range. It is probable that the large grove of "Arizona cypress" described by Prof. J. W. Toumey (Garden and Forest, VIII, 32) in 1895 on Pine Creek at the "Natural Bridge" in central Arizona is *Cupressus glabra*. Prof. Toumey appeared at that time to doubt that this Pine Creek cypress was the same as the one (*Cupressus arizonica*) found in the Chiricahua Mountains. He notes, in the case of the Pine Creek trees, that the bark "peels off in long shreds," a character not observed in the Chiricahua trees. Arthur H. Zachau, Forest Supervisor, who had seen both the Chiricahua and the Verde River cypresses noted the marked difference in the barks of these trees and called the writer's attention to the northern cypress in 1907. It was not, however, until December, 1909, that the writer found an opportunity of investigating this tree.

The few settlers seen who know this cypress call it "yew-wood," because its smooth purple-red bark resembles that of the northwestern yew, *Taxus brevifolia*.



The Twenty-ninth Annual Meeting of the American Forestry Association

THE twenty-ninth annual meeting of the American Forestry Association was held on Tuesday and Wednesday, the 18th and 19th of January, at the New Willard Hotel, Washington, D. C.

The Board of Directors met in the morning of the 18th and a joint meeting of the members of the Advisory Board and the directors was held in the afternoon. At these meetings, in addition to the routine business, projects for the work of the association during the coming year were discussed at considerable length and some plans were developed of which announcement was made at the sessions of the association later. These plans are also set forth in the pages of AMERICAN FORESTRY.

THE ANNUAL DINNER

The crowning event of the meeting was the dinner at the New Willard, Tuesday evening. About one hundred were present and the speaking was of the highest order. This is the first dinner that the association has held for many years, and it was so much enjoyed that it will probably become an annual institution.

The annual address of President Guild was delivered at this time. It is printed elsewhere in this magazine.

The next speaker was the Hon. Reed Smoot, Senator from Utah. The senator's earnest and forceful address was listened to with the closest attention and interest. Of the proposed Appalachian National Forest, he said:

I believe in the Appalachian forest and have voted for it every chance that I have had. I believe in it so strongly that no technical point ever raised against it will ever have any influence upon my thought.

Continuing, he said:

There are two sides to the question of National Forests in the states that have already or that do not now possess great areas of

land in the public domain. Many of the western people feel that they should be entitled to the benefit of those lands in the public domain, the same as many of the middle western states and others have in the past been benefited by the sale, or virtually the homesteading, and our different land laws that applied to them. As far as I am concerned, I wish to say that I approve of the administration of our land laws in such a way that every acre of the public lands shall be disposed of to the best advantage, not only of the people within the state, but of all the people in the Nation.

Adverting to the agitation over the high prices of the necessities of life, he said:

Statesmen do not agree upon the reason why. From all sections of the country we have reasons given, but hardly two of them agree; and I thought to myself that unless this great system of maintaining our forests is maintained most rigidly, many of us here tonight will live to see the day when every soul in this country will wonder how it was that the statesmen of this day did not take better care of the natural resources of this country. We are excited today over the price of potatoes, of beef, and of the breakfast table, but a quarter of a century from now every citizen of this Nation will be excited over the price of the blessings that God intended should be for all time, and that He bestowed as natural resources for the benefit of all the people.

The speaker referred to his experience a year ago in studying the forest methods of Europe, and especially those of the great municipal forest of Zurich, the Sihlwald. He described the care that is there given to the trees and to the recording of their individual history. The German methods of close, scientific study were also referred to. He said:

I have heard men upon the floor of the Senate say that it was not trees but men that they wanted. They forget to read history aright. A treeless country is no place for man, and the history of every country upon the globe proves it.

In closing, he said:

I hope to have a chance as a western man (or I would rather by far say as an Ameri-

can) to vote for the Appalachian forest reserves. I ask nothing for my state that I am not perfectly willing to grant to any other sister state in this Nation.

The President paid a tribute to the patriotism and energy of the early settlers of Utah who transformed the desert into a garden, and then introduced Mr. Gifford Pinchot, whose delightfully reminiscent remarks are reproduced in another place in this magazine.

The next speaker was Mr. G. Grosvenor Dawe, managing director of the Southern Commercial Congress. Mr. Dawe spoke eloquently of the value of high purpose in life and of the spirit called out by the forestry movement. Said he:

I happened today to go into a stock-selling shop in this town. I was not there to buy stocks, by the way. I looked at those men who were watching certain figures go upon the board. I heard the clamor of a man calling out words from a ticker. I saw men rushing here and there, and the faces of those men impressed me as being foxy. They were not such faces as are here tonight. Those men were eagerly watching the moment. They were seeing the opportunity for personal gain in someone else's damage. These men and women here are not seeing the moment. They are seeing the everlasting future of the United States, and giving their thought and their prayers and their work to make that future as glorious and more glorious than the past.

And that is my word to you. It is my word to the men younger than myself here, to be seized by a purpose that is bereft of selfishness; to kneel before God in whatever way we may choose to picture Him in our hours of devotion, and to say that our lives are to be given to something broader than our own pocket books, wider than our own little circle, and something that shall make a greater nation out of our little, petty, vanishing lives. To be grasped by such a thought is to lift our petty humanity up into divinity. And that has been the kind of thought that I have had in these recent years, when I have come under the influence of the thought of some of these men who have been blazing the way for a greater and an enduring nation. And you are some of them. You are ministers of a new gospel. Our race carefully and painfully climbed upward to a comprehension of God; and then there came a comprehension of our neighbor, and these preachers of the new gospel are preaching the gospel of duty to the race whom we shall never see. It is a culminating thought actuating the souls of men in this century.

whose work and whose benizens will come from generations yet unborn.

And that is all I have to say about forestry tonight. It is a summons to a broader thought, to truer patriotism, to absolute unselfishness; and some of these men who have led the way in it have been willing for the moment to sacrifice themselves that the idea might be lifted up out of petty quibbles into a National issue. And if in this great forward movement, an humble disciple of which I am, there is to be one to stand as a leader, let it be the Sir Galahad of the forest work, a man whose heart is pure and who therefore has the strength of ten.

The closing address of the evening was given by Mr. George H. Maxwell, of Illinois. Mr. Maxwell discussed the White Mountain and southern Appalachian bill in its National aspect. The need of reforestation and tree growing, with National, state, municipal and private forests. In closing, he spoke of the work of the association, its importance, and the need of large expansion.

The singing of "America" and drinking of the health of the President of the United States closed the evening.

Those present were:

A. A. Anderson, Philip W. Ayres, W. H. Andrews, Chas. S. Bradley, Ernest Bruncken, Joshua L. Bailey, Elbert F. Baldwin, W. R. Brown, Henry E. Burnham, Elmer J. Burkett, William Brosmeth, B. Franklin Betts, B. M. Caldwell, Aubrey L. Clark, Mrs. James B. Case, Miss Case, William W. Cocks, J. Harry Cunningham, Jas. H. Cutler, Pleasant T. Chipman, G. Grosvenor Dawe, H. S. Drinker, Mr. Guest, Don Davenport, Lewis Dill, Allen Farquhar, A. B. Farquhar, Henry Farquhar, John H. Finney, Henry W. Farnam, J. A. P. Farnham, Mrs. F. W. Gerard, Curtis Guild, Jr., John T. A. Hussey, Thos. Hyde, Samuel L. Hartman, Stewart Harts-horn, Wm. S. Harvey, Wm. S. Harvey's guest, L. B. Hanna, Mrs. Allen Hollis, H. A. Hurt, Frederick W. Kelsey, Miss Florence Keen, George M. Kober, Jasper M. Lawford, Robt. C. Lippincott, Otto Luebckert, Mrs. Otto Luebckert, Barrington Moore, Geo. H. Maxwell, John McLirey, Willis L. Moore, M. J. McCreight, C. L. Marlatt, J. Horace McFarland, John W. T. Nichols, E. F. Perry, M. M. Parker, Chas. Lathrop Pack, Gifford Pinchot, Ulysses G. B. Pierce, Miss Ruth Putnam, E. Bertram Pike, J. T. Rothrock, Cuno H. Rudolph, F. W. Rollins, F. W. Rane, Miss Louise Rowell, Miss Mary A. Sharp, Miss A. D. Slocum, Edwin A. Start, Reed Smoot, Ed. R. A. Seligman, Mrs. M. I. Seligman, Willard Saulsbury, H. St. George Tucker, Mrs. H. St. George Tucker, W. H. M. Thomas, S. B. Vrooman, John P. Viall,

Walker F. Wilcox, Richard B. Watrous; H. E. Waernicke, Asa S. Williams, Geo. P. Whittlesey, John W. Weeks.

THE WEDNESDAY-MORNING SESSION

The first business session of the association convened Wednesday morning at 10 o'clock in the small ball-room of the New Willard, with President Guild in the chair. Messrs. George P. Whittlesey, F. W. Rane, and Edwin A. Start were appointed a committee on nominations, and Messrs. S. B. Elliott, Allen Hollis and Charles F. Nesbit, the committee on resolutions. Later, President H. S. Drinker, of Lehigh University, was made a member of the committee in Mr. Nesbit's place. The report of the Board of Directors for 1909 was read by the Secretary:

To the Members of The American Forestry Association:

When the present board of directors assumed office a year ago, the affairs of the Association were at a somewhat low ebb, owing to circumstances to which it is needless to refer now. There was no secretary in charge and some changes were immediately necessary in the working force of the office. These were made. Dr. Thomas Elmer Will, who had for several years been the Association's secretary, kindly consented to take editorial charge of the magazine pending a permanent reorganization, and he has retained that responsibility up to the present time, with some assistance from the magazine committee (President Guild, Professor Graves, and Mr. Start).

The immediate problem confronting the board proved to be a difficult one, the appointment of a competent executive secretary, or general manager, the officer upon whom the efficiency of the Association must largely depend. After some months of failure to find the right man, Royal L. Melendy, of Chicago, was engaged by the sub-committee on secretaryship (Messrs. Start, Ayres, and Luebker), and was put into the field about the first of August, with the approval of a large majority of the board, pending a meeting of the full board and formal action. Before the board met on the 18th of October, Mr. Melendy left us and took a position with the new National Conservation Association. Confronted by this emergency, the board tendered the appointment to one of their own number, Mr. Start, and he accepted the appointment, carrying with it the general management of the Association's work and the editorial and business direction of the magazine. Prior to this time the general duties of secretary were performed by our treasurer,

Mr. Luebker, acting under an interim appointment by the board. The Association is much indebted to this loyal officer for this service, rendered during a critical period, in the intervals of an active business life.

The brief period since the assumption of office by the present secretary has necessarily been largely given to detail work, getting into touch with the members and to bringing the working organization into line with the new personality. No membership work has been systematically undertaken as yet, but a substantial addition of 118 members was made in December. The total membership December 31, 1908, was 6973; and December 31, 1909, 6827; a net loss of 146. Eight hundred and twenty-nine died or resigned during the year, and 683 new members were added. This showing, under the circumstances, is most encouraging in its evidence of the stability of our membership, in the face of unfavorable conditions. The coming year must show a large increase, for never was forestry so live a national subject; nor the Association better prepared to be its advocate.

The magazine is the most important instrument of the Association, and no effort should be spared to make it even more successful as the only popular monthly magazine of national circulation representing forestry. In 1908, in the midst of the enthusiasm attending the inauguration of the so-called "conservation movement," the name of the magazine was changed, not by action of the Board of Directors, from FORESTRY AND IRRIGATION to CONSERVATION. A very large number of the members of the Association have felt dissatisfaction with this change and have regarded the issuing of our magazine, without reference to forestry and with a title somewhat too comprehensive, to have been a mistake. To this the directors gave their attention early in the year, and the question was thoroughly studied from all sides. The name of a magazine is sometimes a matter of great importance to its welfare, and we believe this to be the case with ours. Finally, the directors voted unanimously to change the name, after consultation and with the approval of the members of the Advisory Board and other officers. When the matter was brought to the attention of these gentlemen, the change was found to meet their hearty approval, only two opinions being recorded against it. Other members were also consulted as opportunity offered. As a result of this canvass, the decision was made to change the name to AMERICAN FORESTRY, beginning with the first number of 1910. The hearty approval of this movement, which has been voiced by a very large number of members in all parts of the country, proves conclusively the wisdom of this change. It has been so well discussed in the magazine that no further statement in regard to it will be made here.

The present policy of the Post Office Department in adopting a stricter and more consistent interpretation of the law relating

to second-class mail matter has raised an issue which the Association must meet. Our present plan of publication does not comply with the law as interpreted by the Department. A circulation made up of members of an association who pay dues and receive the magazine without extra payment is not accepted by the Department as a *bona fide* subscription list. Whether this is just or not in its application to our Association does not enter into the case. It is the decision of the Department and seems to be warranted by the law. The officials admit that the Department has been lax in the past in the administration of the law, and they are using reasonable consideration in regard to contracts and agreements already entered into, but the provisions of the law are to be strictly enforced in the future.

Two alternatives are open to us. We may separate our membership from the subscription to the magazine and continue to publish as we are now doing. That is, we may charge our members dues of one dollar, or such other amount as the Association may determine in its By-Laws, and may then charge those who wish to subscribe for the magazine two dollars, or such other amount as we may determine upon for a subscription price. By following this course we may keep the magazine under the general Act of 1879.

It is also open to us to make entry under the Act of July 16, 1894, which relates to publications of benevolent or fraternal societies or orders, and of professional, literary, historical or scientific societies, but under this act, as now interpreted by the Department, we cannot carry any advertising. The advertising business of AMERICAN FORESTRY is not large, but it nets the sum of from \$1,200 to \$1,500 a year on its present basis, and this will be increased with the increase of circulation. As our income is limited, and no margin of profit is provided in our publication work, the loss of this sum would mean a decrease in the quality of the magazine. As we hope to make the advertising more profitable, the prospective loss is greater than the figures here given.

The other solution which we are informed by the Department will fully meet the requirements of law, would work out in this way: Make the ordinary annual membership fee one dollar. All those persons who are sufficiently interested in the work of the Association and wish to contribute to it and to promote its welfare, pay this fee and become members of the Association with such rights and privileges as go with that membership. Then it would be open to them, as to others not members, to subscribe for the magazine at regular subscription price.

Some advantages would come from the latter plan. We should be able to separate, as we cannot now, those persons who are really desirous of promoting the work of the Association and those who simply wish to obtain the magazine. No one who now receives the magazine for two dollars a year

would have to pay any more for it, and there would, therefore, be no reason for dropping any subscriptions. Presumably, therefore, the income of the Association would not suffer, but might be increased by the adoption of this plan. It is, therefore, recommended that the annual membership fee be made one dollar, and that it shall not include the subscription to the magazine.

In connection with the adjustment of annual dues to meet the new requirements of the Post Office Department with reference to our publication, the directors recommend that the By-Laws be amended by making the annual dues one dollar, and that a class of contributing members paying ten dollars annually be established, to occupy the wide gap between annual and sustaining memberships. Specifically, this recommendation is that the words, "Contributing Members," be inserted in Art. III, Sec. 2, after the words, "Sustaining Members," and that the following be inserted in Art. III, Sec. 3, after the sentence relating to Sustaining Members and before that relating to Annual Members: "Contributing Members are those who pay annual dues of ten dollars (\$10)."

In 1908 The American Forestry Association was the only National organization which seemed to be so made up as to push the new conservation movement, and there was at one time some danger of the Association being absorbed, so far as its most vital interests were concerned, in this varied and Nationwide movement. The organization last year of the National Conservation Association complicated the situation for a time and the function and the future of the organization seemed to be seriously involved. Conference between officers of the two associations and a careful study of their functions and purposes cleared the situation and made it possible for us to direct the work of The American Forestry Association along lines in harmony with its early history and also with present tendencies. At present there is every promise that the two organizations will work in harmony, cooperating at many points, and that conflict of interests and duplication of effort will be avoided. Such an outcome is much to be desired, for any injurious competition that would affect the work of any organization that stands for great National principles like ours would be a public calamity. As it is, the American Forestry Association will go forward, pursuing the course marked out by its work of nearly thirty years, increasing—we hope—its membership and power, publishing a magazine that will be made a great educational force and a reliable authority in its field, striving for legislation that will promote the preservation and cultivation and wise utilization of our forests, together with all allied work for the conservation of natural resources, so much of which so far as soils and waters are concerned, comes back to the forest ultimately.

We hope to do more in the future than in the past in the promotion of state and pri-



GIFFORD PINCHOT

President National Conservation Association (see page 113)

vate forestry work. It is the desire of the present board, through the assistance of its members, to become associated more closely with the various commonwealths and with the people who are working for the advancement of forestry in them. Notwithstanding the enormous National Forest domain and the work that the Nation has to do, the real future of forestry in the United States lies in large part with the states and their individual citizens, and, in accordance with the spirit of our American institutions, this will continue to be so, notwithstanding the inevitable extension of National activities.

The measure of National legislation for which there seems to be most imperative need at this time is that for which the Association has consistently labored since 1905, a law providing for the establishment of National Forests on the great Appalachian watersheds of the East. We do not need to enlarge upon the subject in this report. It has been for a long time before the Association, has been discussed in all its phases, and will continue to be until something is done. There seems to be no change in the reluctance of Congress to act in this matter, but the passage of a bill through the House during the last session and the fact that only

the lack of time prevented its passing through the Senate, and the approval given by the President in his recent conservation message, seem to offer a fair prospect that something may be accomplished during the present session. To that end the Association will lend its energies. The individual states cannot afford to meet the cost of these forests out of their treasuries. We, therefore, urge members of this Association all over the country to write to their Senators and Representatives in Congress the urgent need of this National legislation.

There are several plans of work at present under consideration, but they are not sufficiently developed for discussion at this time. As they are worked out they will be brought to the attention of the members during the year.

In closing this report, we wish to urge that the cordial and active support of the members of the Association is worth a great deal in furthering its work. To reach the different parts of the country, we must hear from the members who live in them, and this we are always glad to do. We ask for your suggestion and your counsel, and the machinery of the Association is always at the



ALBERT F. POTTER
Associate Forester (see page 106)

disposal of its members for the promotion of any well-considered work for the advancement of forestry.

Respectfully submitted, for the Board of Directors,

EDWIN A. START,
Secretary.

After some discussion of its provision, the recommendations in regard to the change in the annual assessment to members and the separation of the dues from the magazine subscription in accordance with the requirements of the Post Office Department were adopted, thereby making the annual dues to the association one dollar, which entitles the member to all the rights and privileges of membership, including all publications except the magazine, the subscription price of which will be two dollars in addition. An additional class of members was also instituted, as recommended by the report, these being known as contributing members, paying ten dollars annually.

In reply to a question, it was stated that all present members will be carried through the year under the old arrangement which provides that the annual dues shall be two dollars and shall include the magazine subscription, but new members will come in under the new arrangement and at the close of their present term of membership, the new arrangement will also apply to old members. The Secretary made the following supplementary statement:

In view of the meetings held by the Board of Directors and by the Advisory Board yesterday, it is possible for me to add an informal statement to the report which has just been rendered and acted upon. The two bodies that met yesterday considered with considerable care and in considerable detail the future work of the Association. We felt that it was advisable to organize it more highly, as fast as our means would allow, and I can indicate an outline of the kind of work it is proposed to do, a fuller statement of which will be sent to all the members in the very near future.

The Magazine Department will of course continue to be one of our most important lines of work. It will cost more money, yield us more income and require more labor.

A department which, for the want of a better name, we may call the Educational Department, will be carried on for the issuance of small publications, bulletins or leaflets on special subjects, that can be distributed freely

or at a nominal cost, as the magazine cannot be.

A lecture service will be instituted, and we hope to be able to provide competent lecturers in different parts of the country, in the very near future. The plans for this are as yet only on paper, but they will be worked out as rapidly as possible.

We shall also try to make the correspondence work of the Association, always an important feature, more important than ever. We shall try to be a center of information for the members of the Association, and by keeping in touch with the best authorities we hope to be able to disseminate knowledge directly and personally through this correspondence work.

Then, of course, we shall have to carry on more or less in the future, until our laws are perfect, the legislative work in the Nation, and, as far as we are able to cooperate, in the states, until the laws that are written on our statute books come up to the ideal standard. That apparently indicates that the Department of Legislation will be a permanent feature.

To organize all this work means the necessity of a very large income, larger than we have now, and in that connection I would like to make an announcement in the hope that the announcement may be of help, directly or indirectly, in carrying out this purpose. Yesterday the pledge was made in one of our meetings by a member of the Association that he would be one of ten men to pay into the treasury \$50 a month for one year. A response was made to that at once, so that we have two pledges of that amount. If we can get the others in, it will give us an additional income of \$6,000 for the coming year, which will help us tremendously in the expansion that is very necessary at the present time.

It was voted that the statement of the vote of the representatives on the Weeks' bill in the last session of the Sixtieth Congress be printed and sent to every member of the association, calling his attention to the vote of his representative. On behalf of the Finance Committee, Colonel Harvey stated that the Report of the Treasurer had been received but had not as yet been audited, and on his motion it was referred to the Committee on Audit, to be published in the next issue of the magazine. The report is accordingly published in this connection.

THE WORK OF THE WOMEN'S CLUBS

This closed the business of the morning session and the President introduced Mrs. F. W. Gerard, Chairman

of the Forestry Committee of the National Federation of Women's Clubs. Her address follows:

Mr. President, ladies and gentlemen, I am very glad that this organization agrees with Mr. Choate in no longer regarding women as a side-issue.

I represent the Forestry Committee of the General Federation of Women's Clubs, the National Committee. I bring to you greetings from my committee, in forty-six states. While they are geographically far they are spiritually near. I hope that when I finish this slight report, because I could not in the time which you would be able to grant me give you any idea of the activity of this department of the General Federation of Women's Clubs, not to leave you in the state of mind in which the old farmer was when the forester said, "Are you not going to do something with all your land for forestry?" He said, "Well, I did think of it, but my wife belonged to a woman's club and they had a paper on forestry, and she said there wasn't nothing in it!"

I have come here today to learn from you and to exercise my purely feminine prerogative of offering you service and to talk a little. Our organization, I think, is so arranged that it can be most useful to you. Some of our state foresters recognize this. But I do not think you have used us as thoroughly as you might. You need an educated public sentiment, and we need your help, we need your lecturers, and we need, I think, direction. In this system that we have, we are almost like a great telephone or telegraphic system, the state standing committees conforming to those of the General Federation. The Chairman of the National Committee sends word to her state chairman, of which, as I told you, I have forty-six. The state chairman takes the message to her state convention, where it is given to the individual club, and finally, through the interest of the individual in what she learns at her state convention, it is taken to her home and wisely fed to the gentleman who sits behind the roast, at the proper time, and gradually, whether he has interest in this subject or not, he sees it in the paper and his attention is called to it, and gradually we do educate these men to certain questions.

Now, all of this is at your service. We have worked like heroes for the Appalachian bill. I have written over a hundred letters, and I have sent a number of petitions signed by President Hadley and Professor Graves, and many of our fine Connecticut people and organizations, and as I say I have written over a hundred letters myself for the bill. I am prepared to set the great machinery of 800,000 women to work for you any time you say the word.

You can readily imagine from what I describe to you, that it is really the one woman's power of speech—and even that,

you know, is not to be lightly regarded—raised to its eight hundred thousandth dimension.

Our women are doing splendid work. I have not all my reports because we report biennially, and our biennial comes in May. But I have learned that in Nebraska, for instance, the women of the Forestry Committee have bought a little piece of land with trees, and are about to establish a municipal forest, not only with the idea of educating people to the value of municipal forests, but also from the standpoint of property-owners, to fight out this vexed question of the annual tax on the timber. That is a great point in doing this thing.

In Montana one of the clubs of the state federation has bought a forest reserve. They have had that some years, a small one, and they are administering it and doing for the good of the people.

It is rather significant to me that where the great hostility to this great movement has been so strong, the women-folk, "to a man," are organized and fighting that hostility. That is the case in Colorado. They are strongly in favor, and always have been, of forestry, and while I have no desire to introduce any bombs into this convention, they have a vote there, and they sent a representative to the legislature. This last term that representative was pledged to the support of forestry measures. I should like this to be on record, because it has been otherwise stated, that the Colorado Federation of Women's Clubs was the first to indorse the conservation measure of our last administration—I mean the first among women's organizations. They took this action on the first of October, 1907. They sent lecturers (and it is done all through the states) up and down the state, talking forestry, telling the people of the laws, telling them of privileges under the laws. Also they are trying in many cases to have introduced some elementary forestry in the public schools. In one state they have a very fine little pamphlet which gives the whole process of maintaining a school garden. A very public-spirited gentleman in Michigan has bought lots and placed them at the disposal of the women's clubs, who administer them, and establish the school gardens for the children, so that these children shall be raised as the German children are, as foresters; so that they will learn to be tree-planters; and learn to know something of the tree from the very beginning. We have the most explicit directions for the plan for the school garden in a little pamphlet.

What I wish especially to say in my message to you today is that the Governors have formed conservation commissions in most of the states; there is this great organization of ours for molding public opinion; and then this association. In addition, there are in many of the states, state foresters. Now, why can we not unite on some one thing to begin with? When I clean house I begin on one thing. Now, why can we not, say,

all unite on this question of the annual tax on timber? Let us begin on one thing. Of course, I am not wise about constitutions and things that have to be written in the constitutions. I know that taxation is a very complex question; but in order to get out anywhere, we have got to begin. It has seemed to me as if we might all unite on that one thing. We are all working in other directions, but let us combine on that one thing.

Another thing. You have spoken of wanting to send out lecturers. That is our greatest need. From all over among the states it comes to me, Where can we get lecturers? Many of our state chairmen have informed themselves upon the larger issues and have gone up and down the states. I have done so in Connecticut for seven years. It has been a matter of astonishment to me that while the people are willing to do things, yet they are ignorant. In Connecticut we have had for ten years a law granting remission of taxation, but seven years ago I could not find a single farmer who had ever heard of that law. Last winter I sent copies of this law out among the churches in all the farming districts, and asked the ministers to read it to the people. I felt that it was as good gospel as they could hear.

In regard to having lecturers, I think you will find that the women's clubs are very anxious and willing to combine with you, and that they will help you to get your audiences; that they will reach out and get legislators there, and people who should be reached, and that they will get the farmers, the very kind of people who should be educated. They will furnish the place and get the audience and combine with you in every possible way.

Finally, gentlemen and ladies, I wish to say to you that the women of this country are awake upon this question. We share with you the higher vision; we are earnestly at work trying to raise, by teaching these things in the schools and in other ways, a race of tree-planters instead of a race of tree-destroyers.

Dr. Rothrock paid a high compliment to the splendid work for forestry done in Pennsylvania by Miss Myra L. Dock.

A rising vote of thanks was taken to the National Federation of Women's Clubs for their able co-operation in the cause of forestry.

The discussion of the forenoon was on the state regulation of timber cutting, with special reference to the much discussed opinion of the Maine Supreme Court. The first paper was by Mr. Austin Cary, Superintendent of state forests in New York, read, on account of the necessary absence of Mr. Cary, by Mr. Charles R. Pettis. This was

followed by an address from the legal point of view by Allen Hollis, Esq., Secretary of the Association for the Protection of New Hampshire Forests, and a member of the New Hampshire bar. Owing to the great interest and importance of this subject these papers will be published in a later issue of *AMERICAN FORESTRY* in connection with an abstract of the Maine opinion.

WEDNESDAY AFTERNOON—RESOLUTIONS AND OFFICERS

At the afternoon session, which opened at two o'clock, there was a general discussion of some of the questions, taxation and the police power of the state, which had been raised by the papers of the forenoon. This was participated in by Mr. George H. Maxwell, Mr. C. R. Pettis, Mr. F. W. Rane, President H. S. Drinker, of Lehigh University, who gave some account of the work that the University is doing in the field of forestry education, Mr. Mowry, Forest Commissioner of Rhode Island, Mr. Allen Hollis, of New Hampshire, Dr. J. T. Rothrock, Mr. S. B. Elliott, Mr. John H. Finney and Mr. S. L. Hartman. Director F. H. Newell, of the Reclamation Service, also addressed the meeting.

The Committee on Resolutions made its report and resolutions were adopted as follows:

Resolved, that for purposes of taxation this Association approves the general policy of separating growing timber from the land upon which it stands; that the land be taxed each year, and the timber only when it is cut, when a proper tax shall be paid.

Resolved, that it is the sense of this Association that the long period of time required to provide a forest sufficiently mature to furnish merchantable timber and other forest products renders it absolutely necessary that immediate action be taken to restore the forests on cut-over, burned-over and now barren lands, to meet the necessities of the people in coming years and maintain the prosperity of the Nation, and that no other appropriation of money for the public use by National or state governments would be so advisable or so useful for the welfare of the country.

Resolved, that appropriations by both states and the Nation for forestry purposes should be on a scale commensurate with the

vast importance of the subject, and with a full recognition of the fact that forests are National safeguards and defenses against National destruction by the forces of nature, just as forts and navies are National defenses against foreign invasion.

Resolved, that the protection of the watersheds of the country by forest growth, whereby an equable flow of springs and streams is secured, is co-equal in importance with the production of absolutely necessary forest products, and the theory that little or no beneficial effects are shown in the flow of springs and streams from the presence of forest growth is opposed to well known facts throughout the world. The error of such a claim would, if carried to its logical conclusion, lead not only to the total destruction of present forests, but would prevent the production of future forests, and regions now covered with forest growth would be reduced to barren wastes as are many portions of the Old World.

Resolved, that the American Forestry Association welcomes the cooperation of the General Federation of Women's Clubs. Such cooperation of earnest, patriotic women will be of inestimable value in bringing home to the people of our land, to the children in our schools, the principles for the spread of which our association exists. It is a cause that will appeal to the patriotic sentiment of the women of the United States, and that their aid should have been tendered in the gracious presentation of the subject today by Mrs. F. W. Gerard is a matter for hearty congratulation and encouragement to all interested in forestry.

Resolved, that this Association endorses the project of a Southern Appalachian and White Mountain National forest as a matter of great importance to the industrial, agricultural and river navigation interests of the Southern, Middle and New England States. Such reserves would extend to the states concerned the same measure of aid and protection that has been so bountifully extended to the West, and would be of the greatest value and importance to our National interests.

The Committee on Nominations reported the following list of officers for the coming year and they were duly elected:

President, Curtis Guild, Jr., of Massachusetts; vice presidents, Joshua L. Bailey, Pennsylvania; Andrew Carnegie, New York; Charles W. Eliot, Massachusetts; B. E. Fernow, Canada; W. W. Finley, Washington, D. C.;

David R. Francis, Missouri; Rutherford B. Hayes, North Carolina; George Foster Peabody, New York; J. E. Ransdell, Louisiana; J. T. Rothrock, Pennsylvania; Albert Shaw, New York; C. R. Van Hise, Wisconsin; treasurer, Otto Luebker, of Washington, D. C.

Directors: Philip W. Ayres, New Hampshire; Robert P. Bass, New Hampshire; Curtis Guild, Jr., Massachusetts; William S. Harvey, Pennsylvania; John E. A. Hussey, Massachusetts; Otto Leubkert, Washington, D. C.; G. D. Markham, Missouri; George H. Maxwell, Illinois; Charles F. Nesbit, Washington, D. C.; Charles Lathrop Pack, New Jersey; M. V. Richards, Washington, D. C.; Cuno H. Rudolph, Washington, D. C.; Fred S. Underhill, Pennsylvania; J. S. Whipple, New York, and George P. Whittlesey, Washington, D. C.

Auditors: Charles S. Bradley, William L. Hall, both of Washington, D. C.

Mr. Harvey occupied the chair during the afternoon, President Guild having been one of a delegation to the Capitol. The President returned before the announcement of the election of officers, and upon resuming the chair, said:

As your delegates to see certain persons at the Capitol, the delegation composed of Mr. Maxwell and myself report progress with encouraging prospects. I cannot go further than that at this time. I thank you very much indeed for the honor that you have so kindly bestowed upon me; and as we say on the stump in Massachusetts, "Judge a man not by his promises, but by his record."

The meeting then adjourned.

By invitation of the Society of American Foresters several of the members of the Association attended a meeting of that society at Mr. Pinchot's residence, 1615 Rhode Island Avenue, N. W., in the evening and heard an interesting lecture on the growing of eucalyptus by Mr. F. G. Plummer, of the Forest Service.



GRAZING LEASES IN AUSTRALASIA

By A. C. VEATCH¹

United States Geological Survey

WHEN the United States had but one white man to every 10,000 square miles of territory, the matter of grazing on the public lands was one of little importance, but as the population increased and herds of cattle and flocks of sheep did likewise, each man desired for his stock the choicest of the range. As the range was theoretically the property of every man, it soon became for practical purposes the property of the man strong enough to hold it by force. This inevitably led to the "stock wars" which have disgraced many parts of the West, where one man or group of men fixed an arbitrary line, to cross which meant not only the destruction of the stock of the offender, but in many instances his life. Everywhere every man tried to crowd out the other fellow, and each man, feeling insecure as to the future, endeavored to get all the feed from the range. The result was overgrazing, and in many places lands that had formerly produced grass several feet high were stripped.

These conditions have led many thinking men to feel that the time has arrived when there should be no "free range," but that all grazing on public lands should be done under grazing permits or leases. In Australia there has been the same development, only in Australia they have quit talking about government grazing leases on public lands and have exhaustively tried this system.

Our consideration of the matter of grazing leases in Australasia need not

go back beyond the time when a practicable route was discovered through the Australian Blue Ridge Ranges, and the great grazing region of Australia discovered. Prior to that time the settlers had occupied a narrow ribbon along the eastern shores of Australia, limited on the east by the sea and on the west by a formidable range of mountains. When this passage was finally discovered, adventurous spirits sought the new country away from the restraining government influences, and initiated the long line of Australian squatters; just about the same time similar spirits began the settlement of the great sheep-producing region of America. This country in Australia, west of the Blue Ridge Range, was, as in the case of the American sheep country, a semi-arid region, but, by reason of its natural grasses, well adapted to sheep growing, and in a few years the whole range was covered with sheep. The first comers parceled this country amongst themselves and informed the new comers that the range was theirs by right of possession. Attempts were repeatedly made on the part of the government to initiate a system of leasing from which a proper revenue would be obtained, but without avail. The minimum price of land in New South Wales at this time was about \$5 per acre, and when an attempt was made in the legislative assembly to reduce it, the sheep men, by this time wealthy and of great influence, opposed it with all their strength. When the price of the land was finally reduced and people could

¹Mr. Veatch was appointed by President Roosevelt as special commissioner to investigate the laws of the Australasian states relative to the leasing of mineral lands, and spent six months in Australia in 1908-9. Opportunity was thus afforded for incidentally investigating the general subject of land administration in the Australasian states.

afford to buy the land, the sheep men proceeded at once to protect themselves by the purchase of limited areas of ground containing waterholes. The fight for an adequate leasing system dragged on for many years; those who were enjoying the public range opposing it because they felt that such a change would take something from them to which they thought they had a right. When the law was finally enacted it provided that all areas leased should be subject to entry and purchase, as if they had not been leased. This led to inevitable conflict, and finally this plan was abandoned and the leaseholder given a holding with some guarantee of tenure. Under this law half the area of the lease was secure from entry for the full term of the lease, but the other half was subject to entry after a relatively short period. This plan was finally found unsatisfactory and was abandoned for the present one which gives the leaseholder a longer term with the assurance that, while the Government can on six months' notice resume any of the land if it should be needed for closer settlement, such resumption could be effected only when the lessee was fully compensated for damages. Under this plan, which is now general in the Australian States, leaseholders have spent large sums in the improvement of their runs, in sinking artesian wells, building storage reservoirs, constructing fences, planting forage plants, killing noxious weeds, and in other ways improving the range.

As a result, there are today no more enthusiastic supporters of leasehold than the sheep men of Australia. They regard leasehold as the most satisfactory form of tenure, not only for the state, but for themselves as well. While I was in New South Wales one of the large sheep owners of that state returned from a six months' trip to the western United States, where he had spent his time wholly looking into the

conditions in this region. He reported that "the American pastoralists had not got beyond the conditions which prevailed in the earliest days of the industry in Australia; that there was no land legislation in America to give respectable tenures or anything of that kind, and that the industry was carried on in a most primitive way." Some weight is given to Mr. Chaffey's position by the fact that New South Wales, with but slightly less than the combined area of Montana, Wyoming, and Idaho, has two and one-fourth times as many sheep and produces seven times as much wool.

The other Australian states seeing from the new South Wales experience the undesirableness of allowing persons to endeavor to control the range by acquiring the water, adopted the policy of making public reserves of all the watering places in the semi-arid region and of reserving a strip on each side of every water course which contained water for any considerable portion of the year. This plan is now universally followed in Australasia. Only in New South Wales and New Zealand was this "gridironing" or "peacocking," as the Australian calls it, carried to any very great extent, and in both states the land officials state that under the acts which permit the land officers to exchange lands with private owners and the laws which require fencing, they were having no difficulty in controlling the matter, and were gradually repairing the harm already done.

The present terms and conditions of grazing leases in Australasia are briefly summarized in the following table:

This table represents a careful digest of the very voluminous laws in force in the various states and merits the most careful and exhaustive study. It gives a bird's-eye view of the principal features of the grazing systems at present in force in Australasia.

Preliminary Summary of Australasian Leasing (Pastoral)

	Western Australia	South Australia	Victoria		Tasmania	New South Wales	Queensland	
			Grazing area	Pastoral lease			Grazing area	Pastoral lease
Area, maximum.....	No limit	No limit	200 to 1,920 acres	40,000 acres	No limit	No limit	60,000 acres	100 sq. miles
Minimum.....	3,000 to 50,000, depending on district	42 years	To Dec. 28, 1920	To Dec. 29, 1909	14 years	To June 30, 1943	28 years	20 sq. miles
Term of lease.....	To December 31, 1928	Yes	Yes	Yes	Yes	Yes	Yes	21 years
Is lease awarded to highest bidder?.....	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
To first applicant if qualified?..	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
To most worthy applicant as determined by land officers?..	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Average rent per year, per square mile.....	1-2 cent to 3-40 cent	25 cents to \$1.25	1 cent to 6 cents					
Per acre.....								
Per head of sheep of estimated carrying capacity of land....								
Is rent subject to change before termination of lease?.....	No	At end of 21 years	Yes	25c	No	Not more than 14c		
Does lessee have right to purchase a portion of his lease?..	In some districts	No	Yes	No	No	Every 10 years	Every 7 years	
Area which may be so purchased.....	500 to 5,000 acres		Yes	Yes	No	No	No	
Protection of water in such cases.....	All important water reserved by government		200 to 960 acres					
Is improvement of lease required of lessee?.....	No	Yes	Yes	All important water reserved by government	No	Yes	Yes	Yes
At termination of lease does lessee have tenant rights?...	No	Yes	No		Yes	Not always	Yes	Yes
Is leased area subject to resumption?.....	On payment of compensation	On payment of compensation	No	(in 2 yrs.' notice	On 6 mos.' notice	Not more than one-eighth of area	On 6 months' notice	
Is land subject to entry by any qualified entryman?.....	Yes	No	No	No	No	No	No	No
Must lessee stock land?.....	No; but rent is doubled if he does not and halved if he does	Yes	No	Yes	No	Yes	No	No
Total area under lease, 1906 (acres).....	159,130,182	76,321,830	16,683,993		2,000,000	108,000,000	233,500,000	
Total area alienated up to 1906 (acres).....	12,387,085	13,467,925	26,836,043		5,300,000	60,000,000	18,000,000	
Ratio of area leased to area alienated.....	13.1	6.1	2.3		2.5	5.3	13.1	
Percentage of total area of country leased.....	25	31	30		17	54	54	
Number of sheep in 1905.....	8,120,703	6,202,330	11,455,115		1,583,561	39,506,764	12,635,231	

CONFERENCE ON EDUCATION IN FORESTRY

A CONFERENCE of representatives of the various universities and colleges in which forestry is taught was held in Washington on December 30 and 31, 1909, to consider the proper organization of the teaching of forestry in the United States. In the opinion of those who attended this conference, results of the first importance are likely to flow from it. President Drinker, of Lehigh University, declared at the last session that, with an experience of forty years in attending similar conferences of engineers and others engaged in technical work, he regarded this as one of the most remarkable meetings in which he had ever taken part. He ascribed to Mr. Gifford Pinchot, at whose initiative the conference was first called together, its peculiar character. This lay in the fact that the men in whose hands is the molding of educational work in forestry in this country met together with a common viewpoint and purpose, looking to the serving of the public interest as the fundamental aim of their profession.

The first idea of the conference was explained by Mr. Pinchot to have been suggested to him by Prof. Filibert Roth, of the University of Michigan. The call for it was sent out in the early summer, by a letter of invitation to each of some twenty-five institutions. The list included all forest schools and universities and colleges in this country in whose curriculum forestry has any important place. The call set forth that such a conference might be made of very great value to the general progress of forestry in the United States, as well as to the institutions which teach forestry and to the Forest Service, which as the most important employer of foresters is vitally interested in their best professional training. The things to be

considered by the conference were defined in the call as "the objects and the methods of forest instruction, the organization and standards of educational work in the field of forestry, the co-ordination of the work of different institutions, and the needs of the Forest Service and other employers of forest school graduates."

Fifteen of the institutions invited to attend the conference sent representatives. The list of delegates was as follows:

Prof. Frederick A. Goetze, Columbia University; Prof. Carlton C. Curtis, Columbia University; Prof. R. T. Fisher, Harvard University; Prof. C. A. Scott, Iowa State College; President Henry S. Drinker, Lehigh University; Prof. Robert W. Hall, Lehigh University; Prof. F. W. Besley, Maryland Agricultural College; Prof. J. Fred Baker, Michigan Agricultural College; Prof. J. A. Ferguson, Pennsylvania State College; Prof. Gordon T. Tower, University of Maine; Prof. Filibert Roth, University of Michigan; Prof. Walter Mulford, University of Michigan; Prof. C. L. Hill, University of Michigan; Prof. Samuel B. Green, University of Minnesota; Prof. Frank J. Phillips, University of Nebraska; Prof. R. B. Miller, University of New Brunswick; Prof. Bernard E. Fernow, University of Toronto; Prof. Frank G. Miller, University of Washington; Prof. Henry S. Graves, Yale University, and Messrs. Carter, Cox, Ellis, Hall, Kellogg, Riley, Smith, and Zon, U. S. Forest Service.

The meetings were held at Mr. Pinchot's house, and were opened by an address of welcome from Hon. James Wilson, Secretary of Agriculture. The first two papers presented, by Prof. Henry S. Graves, of Yale University, and Prof. Roth, of the University of Michigan, called forth a discussion which extended throughout the entire first day and evening of the conference. Professor Graves's paper had for its subject, "The Field of Work and Necessary Equipment of the Profes-

sional School of Forestry," and Professor Roth's, "The Curriculum of the Professional School of Forestry." The discussion centered about such questions as the amount of training necessary to equip a forester properly for the practice of his profession, the character of the training necessary; what field work should be done, the relation of the professional school to preparatory schools and colleges, and many similar topics.

Other papers were read as follows:

"Methods of Instruction in the Forest School," by Prof. R. T. Fisher, of Harvard University.

"The Position of the Forest School in the Community," by Dr. B. E. Fernow, of the University of Toronto.

"Forestry in the Agricultural Colleges," by Prof. Samuel B. Green, of the University of Minnesota.

"The Place of Forestry in General Education," by Dr. Herbert A. Smith, Editor, Forest Service.

"What the Ranger Course Should Include," by Prof. Frank G. Miller, of the University of Washington.

"The Field, Aims, and Methods of the Ranger School," by Mr. E. E. Carter, Assistant Forester, Forest Service.

Resolutions adopted at the close of the conference set forth:

1. That the conference goes on record in favor of an association of forest schools.

2. That a committee be appointed with power to call a meeting of the conference at its discretion.

3. That this committee be charged with the formulation of a constitution for the proposed association.

4. That the committee, in consultation with the Forest Service and other employers of foresters, formulate a standard of forest education.

5. That the proposals of the committee be submitted to the members of this conference in advance of the meeting at which they are to be considered.



Young White Pine Growing Under White Oak and Pitch Pine

HENRY SOLON GRAVES, FORESTER UNITED STATES FOREST SERVICE

ON THE 12th of January the President appointed to the office of Forester of the United States, Henry Solon Graves, the Director of the Yale Forest School. How completely Mr. Graves fills the requirements of this exacting position by reason of professional training and practical experience is shown by his record.

He is the son of Prof. W. B. Graves, for many years professor of natural sciences at Phillips Academy, Andover, Massachusetts, and recently retired. He was born in Marietta, Ohio, May 3, 1871, prepared for college at Phillips Andover Academy, and entered Yale with the class of 1892. That he was an all-around man in college is shown by the fact that he played quarter-back on the University football team and gained high rank in scholarship. He was an intimate friend of Gifford Pinchot and was led by him to enter the study of forestry. After a course of graduate study at Harvard, he joined Mr. Pinchot at Biltmore, where the first application of scientific forestry to American conditions was then being made on the estate of George W. Vanderbilt. At that time there were no forestry schools in this country, and, after a period of practical work at Biltmore, Mr. Graves went abroad to study in European schools. This was only a few years ago, and yet he was the second American to enter the profession of forestry, Mr. Pinchot having been the first. His European studies were carried on under direction of the most eminent of the old world foresters, Sir Dietrich Brandis, principally at Munich. On his return to the United States he was associated with Mr. Pinchot, who was then practising as a consulting forester in New York City, and they

collaborated in the preparation of a volume on "The White Pine." Mr. Pinchot became forester of the Department of Agriculture in July, 1896, and Mr. Graves was his first assistant. While in this office he continued forest explorations and investigations in the West. Two of his publications at this time were "The Black Hills Forest Reserve" and "Practical Forestry in the Adirondacks." The Yale Forest School was founded in 1900 and Mr. Graves left the Division of Forestry to become director of the school. In that work he has been conspicuously successful. The Yale Forest School was the first advanced school of forestry in the country and it has maintained a leading position. In the intervals of his work at Yale, Mr. Graves has made a number of trips to the National Forests of the West as advisor of the Government or for the private study of forestry problems.

His publications have been of a high order of professional merit. In addition to those that have been mentioned they include, "The Woodlot," "Forest Mensuration," "The Woodsman's Handbook," and various others. He is editor of the Proceedings of the Society of American Foresters and is a prominent member of the organization. He has been for several years a director of The American Forestry Association and has served on its Executive Committee and very recently on its Magazine Committee. In this connection, he has had much to do with the plans for the improvement and development of AMERICAN FORESTRY. He was a member of the National Conservation Commission, is chairman of the Connecticut Conservation Association, president of the Connecticut Forestry Association, vice president of the Society for the Protection of New Hampshire Forests,

a member of the Connecticut Academy of Sciences, an associate editor of *The Forestry Quarterly*, a member of the Royal Arboricultural Society of England, member Société Forestière de Franche Comté et Belfort (France), and a member of the Oesterreichische Reichsforstverein (Germany). He is also a member of the Century Club of

New York and the Graduate Club of New Haven. In 1903 he married Miss Marion Welch of New Haven. His summers are largely spent at Milford, Pennsylvania, where the Yale Forest School students receive field and camp instruction.

Mr. Graves assumes his office as Forester on the first of February.

ALBERT F. POTTER

ALBERT F. POTTER, who has been designated by the Secretary of Agriculture as Associate Forester, is a western man with a wide knowledge of the conditions existing west of the Mississippi River.

Mr. Potter was born in Amador County, Cal., November 14, 1859, and spent his early childhood on a farm. He came to Oakland, Cal., in 1867 and thence to San Francisco in 1871. He was a pupil in the public schools of Oakland and graduated from the Hayes Valley Grammar School of San Francisco in 1874. Subsequently he studied bookkeeping at a night school, serving as an office boy during the day in a sewing-machine establishment. His employer advanced him successively to the position of shipping clerk, salesman, buyer, correspondent, bookkeeper, and cashier. In 1883 he resigned his position on account of illness, and went to Apache County, Ariz., where, after regaining his health, he successfully conducted a live stock business.

Mr. Potter was exposed to all the vicissitudes of life to be found on the western frontier, and has watched the West grow from a thinly-settled wilderness to its present state of settlement and wealth. In 1893 he was appointed inspector for the Live Stock Sanitary Commission of Arizona, in which capacity he served for two years. He also served as county treasurer during

1895 and 1896. Owing to continued drought, he disposed of his cattle interests in 1895, and in 1896 engaged in sheep raising, continuing in this business until 1900. While in the sheep business he took an active part in the organization of the Arizona Wool Growers' Association, of which he was secretary for two years, and aided in effecting an agreement allowing a proper use of the forest reserves for grazing purposes. It was while secretary of this association that he met Mr. Pinchot, then Chief of the Bureau of Forestry, and accompanied him on a trip of investigation which the Secretary of the Interior had requested Mr. Pinchot to make in cooperation with Professor Coville, to determine the effects of sheep grazing upon the western forest reserves.

Mr. Pinchot, being struck by Mr. Potter's wide knowledge of western conditions, persuaded him to become a member of the Bureau of Forestry, and Mr. Potter accepted an appointment in that bureau in 1901 as an expert to investigate grazing problems in the Federal Forest Reserves, a work which his special training and knowledge enabled him to do very efficiently. During the early part of 1902 he examined proposed forest reserves in Arizona, and recommended the boundary lines for the Santa Rita, Chiricahua, and Mount Graham forest reserves, which

were subsequently created. In the latter part of 1902 he examined proposed forest reserves in Utah, and recommended boundary lines for the Logan, Manti, and Aquarius forest reserves, all of which have since been established.

In 1903 Mr. Potter was in charge of the field party which made examination of forest boundaries in California, which resulted in the creation of the forests which now compose the Trinity, Plumas, Klamath, Shasta, and Modoc National Forests. In 1904 he was assigned, at the request of the President, to service on the Public Lands Commission as an expert. He made a special report on this work, which was pub-

lished as Bulletin 62, "Grazing on the Public Lands."

In 1905, when the National Forests were transferred to the Department of Agriculture, Mr. Potter was made Chief of the Branch of Grazing. In July, 1908, he was made Assistant Forester, in charge of the Branch of Grazing. In this position he started the Government's work in the improvement of National Forest ranges, including the forage investigation, the inauguration of a campaign to rid the ranges of predatory animals, investigations to eradicate poisonous plants on ranges, and experiments in pasturing sheep, as a possible substitute for the herding system in some parts of the country.



A Western Hemlock, Cascade Mountains, Washington, Showing Thick, Rough Bark of the Mountain Form

THE CONNECTION BETWEEN FORESTS AND STREAMS

By JOHN H. FINNEY

Secretary of the Appalachian National Forest Association

IN COMMON with almost the entire Nation, I hold these views regarding the Appalachian-White Mountain forest project: First, that the establishment of this forest area in the southern Appalachians and in the White Mountains is a duty which the Nation owes to itself; that it is a matter of national self-preservation; that only the Nation can do it; second, if the way to conserve is to "conserve," that here lies the tangible and substantial foundation for a constructive policy along conservation lines, at relatively small cost, to the immense present and future advantage of the whole Nation.

The bringing of this project to this point is the result of twenty years of work by earnest men; it has been urged by three Presidents; it has been exhaustively investigated and strongly urged by the Department of Agriculture and the House Committees on Agriculture. For more than a decade it has been before the Congress at practically every session; it has passed the House once and the Senate three times and, being as yet unestablished, it may be proper to frankly outline its present status in the National Legislature.

It is meeting there now, as in the past, some very active opposition, ranging from the Speaker down to those who, in committee, are in position to block progress. One important chairman raises the question of "enormous expense;" another, that conditions are "grossly exaggerated;" a southern member opposes it on the question of "constitutionality." It met last year a powerful antagonist in the person of an army engineer (retired), who held

that forests had no effect on water supply or regulation; this year it meets an equally valiant opponent in Mr. Willis L. Moore, of the Weather Bureau, whose carefully timed report made to the chairman of the House Committee on Agriculture again furnishes welcomed ammunition to those who fight it.

That the constitutional objections have been eliminated by the report of the Judiciary Committee; that conditions are shown to be not in the least "exaggerated;" that the "enormous expense" is but a fraction of what the Nation will finally be compelled to expend if the area is not now established; that the arguments of Colonel Chittenden have been fully refuted by such men as Prof. Geo. F. Swain, Dr. C. E. Van Hise, and other notable scientists, matter little to those who, being in position to block legislation, continue to do so on one plea or another.

I do not measure in scientific attainment to the present distinguished opponent of forestry, but some practical engineering and a little common sense based on an actual knowledge of conditions in the South may shed some light on Mr. Moore's conclusions as reported in the daily press, and show, if a demonstration be necessary, to those who happened to be in Washington on March 4 last, that meteorological science is hardly so exact as to require the acceptance, without question, of the opinions and conclusions of even so distinguished a man as the Chief of the Weather Bureau.

Like the gentleman who recently came out of the North with tremendous claims, but without his notebook and

instruments, Mr. Moore states his conclusions with a great flourish of language—but withholds his records.

Mr. Moore presents ten lofty conclusions. The first four are to the effect that forests do not cause or increase rainfall. Probably not—nobody has said that they do; this conclusion was reached by other investigators a good while ago.

In his fifth conclusion it is asserted that floods are caused by excessive precipitation—a fact which we have, indeed, believed from our youth up. But he also adds that spring floods, occurring from the melting of large quantities of snow, are worse in the forest than in the open. Not so. Colonel Chittenden made the same claim last year and presented records to prove it, but his records were found incorrect and his claims utterly refuted.

Mr. Moore's sixth conclusion is that the effects of soil-erosion have been exaggerated and that "erosion is not always an unmixed evil." People of the South have but to weigh this statement in the scales of their own experience to know how wanting it is. Who will speak up for the benefits of soil-erosion? Certainly not the owners of once fertile low lands, or of present gullied fields and hillsides, or the power companies whose ponds are rapidly filling up!

Conclusion seven is that the mountainous parts of the water-sheds are so small that their run-off would not be sufficient to cause floods even if deforestation allowed a greater and quicker run-off. What a statement! Is there a man who knows one single mountain tributary of an Appalachian stream who cannot, from his own experience, disprove absolutely that statement?

Conclusions eight, nine, and ten are to the effect that the removal of forests from water-sheds does not tend to intensify floods and low waters. This is the important point, and it is here that Mr. Moore is farthest afield. The records of his own bureau disprove his assertions. His own words are: "Floods are not of greater frequency and longer

duration than formerly." Disproved by the Monongahela, disproved by the Cumberland, disproved by the Tennessee, the Alabama, the Savannah, the Potomac, the Wateree, and the Congaree. Disproved absolutely by every southern Appalachian stream whose water-shed has in considerable part been deforested by cutting and fire.

The records for these streams, taken from the Weather Bureau, are published by the Geological Survey and the Forest Service, and are available to all who desire to see for themselves. Mr. M. O. Leighton, Chief Hydrographer of the Geological Survey, made a most thorough and critical examination of the records of the Weather Bureau for several southern Appalachian streams, among them the Ohio, the Allegheny, the Savannah, the Wateree, and the Alabama, and reached the conclusion that, to use his own words, "A broad and comprehensive review of river-discharge records in the United States indicates unmistakably that floods are increasing. It is true that the opposite tendency may be shown on some rivers, while the records for others indicate little or no change; but, taken as a whole, the rivers that reveal more intense flood tendencies so thoroughly dominate the situation that the conclusions above expressed must be inevitable."

The Forest Service studied the records from a larger number of streams than the Geological Survey and found "that in many of the streams in the Appalachian Mountains there had been a steady increase in the number and duration of floods during the past twenty or thirty years," and that the increase is greatest in the streams where the most forest has been destroyed and least on the streams where forest conditions have been least changed.

If this is "false reasoning" or "mistaken enthusiasm," let competent authorities judge on the records as they stand, not as they may be presented for the perfectly apparent purpose of supplying ammunition against forest conservation in general and against the Appalachian project in particular.

A PERSONAL WORD

By THOMAS ELMER WILL

ON SEPTEMBER 1, 1906, the writer entered the service of the American Forestry Association as its Secretary.

With the purchase, in the following December, of *Forestry and Irrigation*, he became, also, the editor of that publication

During the period of his connection with this office he has sought, as much as in him lay, to strengthen the organization, enlarge its influence, and advance its propaganda.

In his first two years, as Secretary, it was his privilege to conduct membership work which brought to the Association 3,532 new members, or more than half of the total membership which the organization, in the twenty-eight years of its life, has acquired.

These members not only paid, during the first year of their connection, the entire cost of their acquisition, but a surplus of \$6,447.46; in addition to which they pledged, for an indefinite period, annual payments of \$8,063 to the work of the Association.

From January, 1907, when the editorial department of this magazine was established by himself, until April, 1908, and again, from March until November of 1909, all the editorials appearing in its columns were his work, as have been most of those published since the latter date

In every practicable way he has sought to embody in living realities the ideals to which the organization has been committed. The Appalachian National Forest work has received special attention. Resolutions by the score, written by his hand, have been adopted at his instance, and a fusillade of letters and petitions has swept the halls of Congress. A heavy correspondence has been built up from nothing; friends of the movement have been kept informed of its progress by frequent spe-

cial reports and synopses of bills; press bulletins have been issued to fifteen hundred newspapers; articles have been written for numerous publications, including the *World's Work*, *Review of Reviews*, *Independent*, *Popular Science Monthly*, *McClure's*, *Journal of the Franklin Institute*, *Vick's Magazine*, *Journal of the Merchants and Manufacturers' Association*, *American Industries*, and others, and the gospel of forestry and conservation has been carried by lectures to North Carolina, South Carolina, Georgia, Alabama, Kentucky, West Virginia, District of Columbia, Maryland, Pennsylvania, New York, Maine, Ohio, Illinois, Wisconsin, Michigan, Minnesota, Iowa, and Missouri. In a single season, sixty-four Chautauquas were addressed, whereby, by a conservative estimate, 65,000 people were reached with the oral message and twice that many more by the accompanying press reports.

With the appearance of this issue of AMERICAN FORESTRY, the writer's connection with the work of the American Forestry Association ends. His interest, however, in the cause to which it is committed abates not a jot.

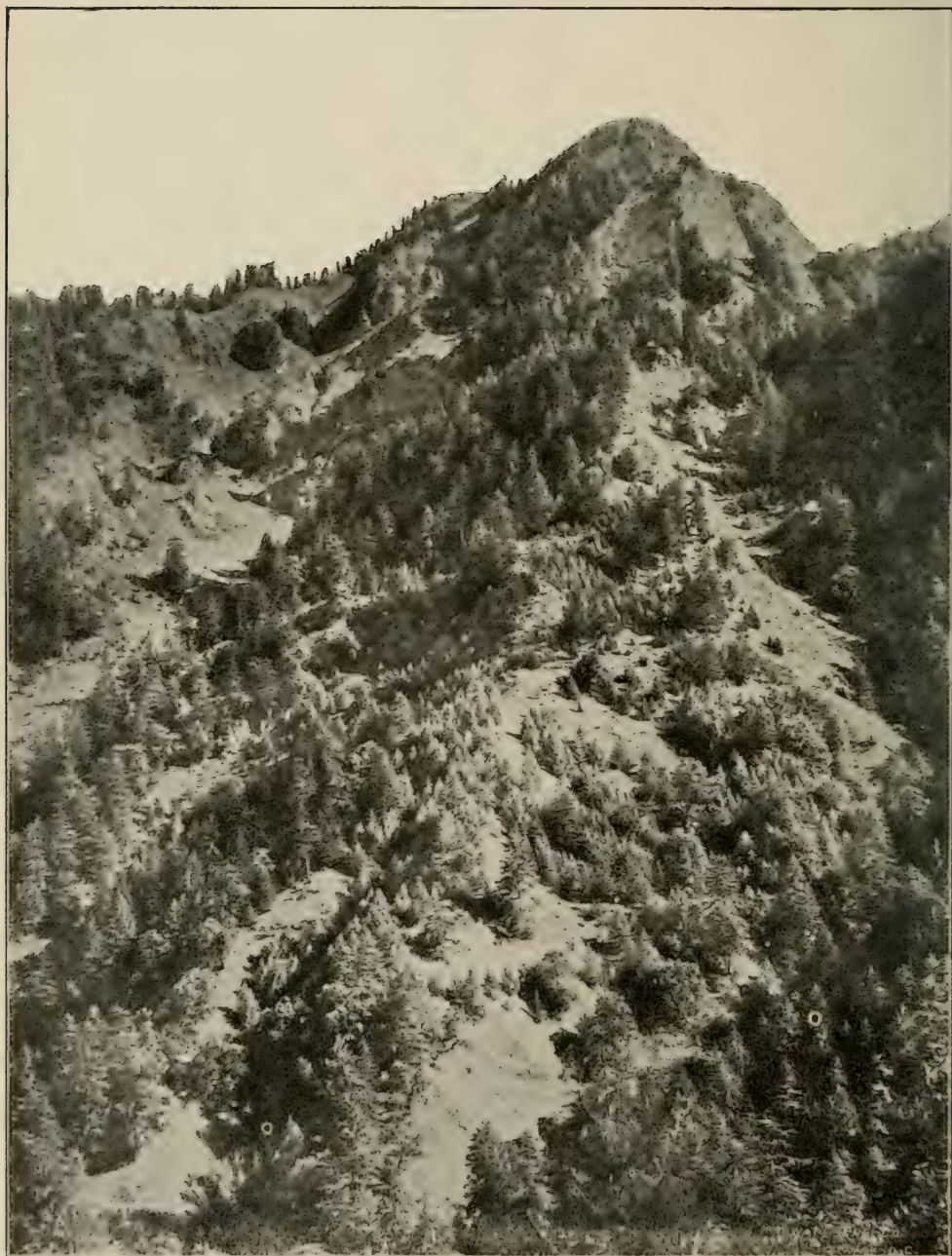
In that movement, in fact, he recognizes but a phase of that broader and deeper movement in which he enlisted while the conservation movement was as yet unborn, and forestry in America was in its swaddling clothes—the movement whose end is the conservation of the equal rights, liberties, and opportunities of all the people, and the establishment and maintenance of conditions under which the least and lowest may live an unfearing and complete life.

As never before, the country to-day is ready to hear and heed the appeal for the conservation of our common heritage and government, and as never before the people are ready to organize to effect this end.

Spontaneously, though uncalled, they

are rallying to the standard of conservation's chief champion, Mr. Gifford Pinchot, who, by his works, has proved his faith that duty is dearer than office, and that higher laws and loyalties exist than those which would perpetuate and intensify conditions already well-nigh unbearable.

In the face of such an example, it behooves every soldier of the common good to stand by his guns and do his duty; and with these the writer hopes, in the future, as he has sought in the past, to be found—ready and patient, at his post, waiting, while wait he must; fighting, when fight he may.



EDITORIAL

Gifford Pinchot

THE sudden act of dismissal by which Gifford Pinchot, the builder of the United States Forest Service, was removed from the office he has raised to so high a level of dignity and usefulness, left the people stunned. It is the reward and the peril of such creators as Mr. Pinchot has been that they become so closely identified with their office that the people can hardly understand their severance from it.

We do not propose to discuss the merits of the dismissal. Every conceivable view of that has been expressed and people may take their choice. We may concede that the gage was thrown down by the forester so defiantly that it must have been taken up by the President. We may even suppose that Mr. Pinchot, who knows official Washington thoroughly, may have expected and courted the action that came so swiftly. He has entered a great fight; the official harness may have galled; he could not resign under existing circumstances; but he could secure relief and freedom to carry on the campaign by this bold stroke. Opinions may differ as to the wisdom of his course, but no one can doubt that his act was a brave one and his purpose honest. On the other hand, we must concede that his provocation was great.

Whatever its merits, this controversy has been swept into the great fog-bound region of politics and personalities, and since this is the case, in order that we may see more clearly, there are certain things that no American citizen should allow himself to forget. It is easy enough to criticize individual acts and errors of judgment in any man who has done great things. Unfortunately, we are not always so ready to take full measure of the good things in his record.

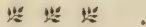
Let it not be forgotten, then, that Gifford Pinchot, who might have enjoyed life easily, who might have had all the fruits of the society tree passed down to him, has elected to be one of the hardest working citizens of this republic, giving himself heart and soul to a cause in which he believed, to a work he loved, because it was a great work, and that he has labored year in and year out with ceaseless devotion in this cause, and with an ever-widening knowledge of its need and its possibilities.

He was the first American to adopt the profession of forestry, which we now know to be one of the first in usefulness, and for which we are now educating young men as fast as our increasing facilities will allow but hardly fast enough to meet the growing demand. His contagious enthusiasm and quality of leadership has been a potent factor in this rise of his chosen profession into favor.

He entered the Forest Service, then a humble division of a somewhat humble Government department, a division that had one room and five or six employees, and built it up to its present proportions, with over two thousand men employed in the administration of the National Forests alone. The Service has the administration of a vast public domain of 190,000,000 acres, presenting problems of stupendous magnitude, which have been grappled with successfully for the most part. If some mistakes have been made in single cases, who should cavil at it? Is there any private or Governmental business of similar magnitude the whole framework of which has had to be created in a few years from the ground up in which mistakes could not be found? Is it often that such a business shows as few mistakes as the Forest Service?

In general, its methods and principles commend themselves to the American people, except to the few who are deprived of their unlimited enjoyment of the use and profits of the public domain.

All this has been done in a wonderfully short time, and popular interest and belief in the value of intelligent forestry has grown correspondingly all over the United States. The advantage of this to the country is incalculable, because its benefits are largely in the future. No propaganda has ever been more unselfish than this. Few of those who have aided it had anything to gain by it personally. We do not mean to credit Mr. Pinchot with having done all this, but he has for over ten years been the active, central figure in this great movement—its “evangelist,” as a western man well expressed it. When criticisms of details of his acts and of his management as a Government official are made, these larger facts should be kept well in mind. The United States is immeasurably richer and better for his work. Can that be said of the work of his critics?

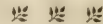


The New Forester

THE general sentiment of the country will applaud the appointment of Mr. Graves as Forester of the United States. The tribute to his personality and his ability from his distinguished predecessor, as expressed at the annual dinner of The American Forestry Association, is printed on another page of this magazine. Nothing could be added to that and nothing need be subtracted from it. It was the plain statement of a friend who knows him as well probably as any man. There is a peculiar appropriateness in this succession to the office, because of the close relation that Mr. Pinchot and Mr. Graves have sustained in the development of American forestry. They two have founded the profession of forestry in the United States, and have contributed more largely than any others to its tremendous development during the last ten years. The appointment of Mr. Graves is a guarantee that the policy of the Forest

Service will remain practically unchanged, that this department of the Government service will lose nothing of its strength and that the flurry that has taken place in the official order of the capital will not be allowed to endanger this great public service.

The National Forest Service has before it two distinct problems, eastern and western. The successful administration of the vast forest domains of the West requires special methods of treatment and understanding of the country and its needs and temper; but the really vital forest problems of the country are coming in the more populous states of the East, where the needs of the people for the products of the forest are continually increasing. The new Forester is amply qualified by wide acquaintance with American conditions and by the highest professional skill to deal with the extensive forestry of the West and the intensive forestry of the East. The appointment of Mr. Potter as Associate Forester likewise strengthens the Service, for his experience with Western conditions, and with the local questions that confront the administrators of the Western forests, will make him a most valuable assistant to his chief. Altogether, the country is to be congratulated that the disturbance which seemed to most people almost revolutionary has turned out so well in this respect.



The Men Behind the Movement

THE recent changes in the Forest Service lend an especial interest to the reminiscent remarks of Gifford Pinchot at the annual dinner of the American Forestry Association. Introduced by President Guild as a man “who needs no official title, a private citizen whom we know as the father of forestry in the United States, and what title could be higher?” Mr. Pinchot, after a few words of acknowledgment, said:

“I have followed along the footsteps of men, many of whom are here tonight: and as I was sitting a few moments ago listening to the end of the admirable speech that Senator Smoot was making, and to the very wonderful

and apt illustration of your President, I was thinking, in the back of my head, of the time that has gone by in this forest movement, about some of the men who made it what it was in the early days, and whose friends have carried on the work until now.

"Dr. Franklin B. Hough, the first Commissioner of Forestry, under whom began the little division which has now spread into the National Forest Service, I think ought to be remembered on a night like this, when, if I judge rightly, you are taking stock of the great advance that has been made in forestry in the last few years, and putting in a new peg, setting a new high water mark of interest and effectiveness and readiness to go ahead. And there are very many other men. There is Dr. Fernow, who followed him, who is now teaching in Canada, my immediate predecessor in the Department of Agriculture. The man whom I want to mention next is one whose march has been steady, continuous, effective, and directly in the leadership of all of us, whose fight was begun single-handed under tremendous difficulties; who, before he was through, had so conquered and held the loyalty of a whole state that when a hostile Governor tried to remove him from his office, he was compelled by the unanimous voice of all the citizens to take him back—Dr. Rothrock.

"No one can look about this room without finding man after man whose services have been very great indeed. There is the senator here (Senator Smoot), the best friend of the Forest Service on the floor of the Senate. He has shown that friendship in two of the hardest fights any Government bureau has had to sustain, and, thanks to him, we pulled through all right; I judge from his talk that when the fight comes the Senator will be there.

"I may have gone out of the Forest Service, ladies and gentlemen. I am not prepared to deny that. But I observe that there is no danger whatever but that the work will go on just exactly the same.

"Now, I could talk for an hour, and a good many hours, just in pointing out the men around this table whose serv-

ices have been great; Mr. Farquhar, Mr. Pack, Mr. MacFarland, your President (whose service has been very great indeed), Mr. Maxwell, Mr. Cox. I am not going to try to go all around the table, because I think practically every man here has served the cause of forestry in a great degree; and the thing I want to say is simply this, that out of the united efforts of the men who are in this room tonight, and a few others not here, has sprung a movement which has consolidated in its grasp the whole of the American people, until there is not any question whatever, that no matter what men come and what men go, the forest work is going straight on.

"Now, there is one man of whom I want to speak a word. No one has ever been more fortunate in the loyal support, assistance and co-operation of the men who were working under him and with him than I have been. I cannot speak too highly of the fidelity, enthusiasm and devotion of the men in the Forest Service. They are as clean and fine a body of young men, and some few old ones, as clean and fine a body of men, I believe, as ever were gotten together for any public purpose in this world, and they have got the spirit that will carry them straight on to do just exactly the same kind of work in the future, only better than they have been doing in the past. And as for men like Colonel Harvey, and others who have given their time freely and generously, who have given their money and their enthusiasm, which is better than all, to carry on this movement, no one has ever been more fortunate than I in the men who worked with me, and with whom I have worked in this whole movement.

"There is one man for whom I want to bespeak your most vigorous and earnest support. When I began forest work a good many years ago in this country, the first assistant I had, the man to whom I turned as the one best able, as I thought, of all the youngsters I knew to take hold of this work and carry it on, was the man, curiously enough, who now steps into my shoes, and will carry on the work that I have had a share in forwarding. Now, there

is no better breed of man grown than Henry Solon Graves. I do not know a more loyal gentleman, a more devoted friend, or a better forester in this country or any other than Harry Graves. I want the Forest Service to stand behind him with the same loyalty, and with more loyalty, if that is possible, (and I doubt it), than they have given to me; and I bespeak for him the very kind of support in his office as chief forester that you gave to me while I was there. I sincerely hope he will have it. He is as worthy of it as anybody can be, and there is nothing that will advance this enterprise any better than your standing behind with the full force of your enthusiasm, and this organization.

"Now, that is what I wanted to say to you. This movement has come up through the years through self sacrifice, and the vigor and determination of a body of men scattered all over this country, from Maine to California, and from Florida to Washington. It has taken a hold on our people, the capacity of which for good it is practically impossible for any of us to estimate. It was out of the work that this association represents that the great conservation movement sprang; and it seems to me, as I look ahead now, that if there is any body of men anywhere in the world that has reason to be sanguine and hopeful and confident of the future, not only ready for the work, but keen to get at it, it is this body, which I am proud to honor, the body of men who are standing behind the cause of forestry in the United States."

Living on the Principal

SECRETARY WILSON rightly says that the great reason for the high price of food-stuffs is that too many people are going to the cities to be fed and too few are on the farms to produce food. This is really the crux of the whole question, and neither boycotts nor temporary legislation will settle it. The comment of the Secretary of Agriculture, above mentioned, fits well with the words of Senator Smoot of Utah, in his address at the annual

dinner of the American Forestry Association, to the effect that unless the present situation were wisely handled the people of the next generation would suffer so heavily from high prices of the necessities of life that they would be amazed at the incompetence of the statesmen of today in handling our natural resources.

It all falls in the same category. The good management of the great mountain forests of the west to get the best results in a large way, both in production and in protection; the more intensive forestry of the populous east, to secure the maximum forest crops and the indispensable protection that the forest gives to land and water, on the older and harder worked hills of the Eastern country; the maintenance of healthy and productive soil conditions and the skillful utilization of the land to produce the best and largest crops and to maintain as many useful animals as possible,—all of these are part of one great scheme that must be developed in its entirety if the American people are to live and prosper on their wonderful heritage. We have been squandering our principal; we must get down to living on our interest, and learn to make that larger year by year.

The Conservation Message

THE President, to give greater force to some of his recommendations that he considered of particular importance to the country, reserved their full presentation for special messages, and in one of these messages, sent in on the 14th of January, embodied his thoughts and wishes upon the various phases of the conservation program: The improvement of our waterways; the reclamation and irrigation of arid and semi-arid lands; the reclamation by drainage of swamp lands; the preservation of forests and reforestation of suitable areas; "the reclassification of the public domain with a view of separating from agricultural settlement mineral, coal, and phosphate lands, and sites belonging to the Government bordering on streams suitable for the utilization of water-power." The last

clause, which is given in the President's own words, expresses what he is understood to regard as the subject of first importance for legislation. There are those who believe that the executive power is sufficient under existing laws to accomplish the desired results in this direction, but the President and his legal advisers, as the public has good reason to know, have doubts upon this point and believe that an unquestioned warrant for necessary action to protect the public rights should be given by legislative enactment.

We do not propose to discuss the message in detail at this time. It deserves that careful and thorough study, which was doubtless given to its preparation. If in some respects it is disappointing, it is encouraging in the fact that the President has believed that this great and many-sided issue called for such extended treatment in his recommendations to Congress. Recognition of the fundamental importance of these questions to the American people shows the President to be in sympathy with the profound convictions of those who hold the most intelligent and unselfish views upon the needs of the country.

Now, let Congress translate this conviction into action and make the President's recognition of great principles effective as far as may be through legislation.

To one item in the message we wish to direct especial attention. Specific recommendations are sometimes lost sight of in these ponderous official documents. In treating the subject of forests the President says: "The part played by the forests in the equalization of the supply of water on water-sheds is a matter of discussion and dispute, but the general benefit to be derived by the public from the extension of forest lands on water-sheds and the promotion of the growth of trees in places that are now denuded and that once had great, flourishing forests goes without saying." The President thus accepts the sounder view of the best forest and engineering science, as against the hasty and unsupported

statements recently attributed to a subordinate government official.

Mr. Taft declares that control over private owners in the treatment of their forests is a matter for state rather than national regulation, "because there is nothing in the Constitution that authorizes the Federal Government to exercise any control over forests within a state, *unless the forests are owned in a proprietary way by the Federal Government.*" The italics are our own. Without caviling over the slight inaccuracy of phrasing, since the Federal Government can own nothing, but can only acquire and manage as the agent of the Nation, we observe that this clause affords an excellent introduction and foundation for the ensuing paragraph, which we quote:

It has been proposed, and a bill for the purpose passed the lower house in the last Congress, that the National Government appropriate a certain amount each year out of the receipts from the forestry business of the Government to institute reforestation at the sources of certain navigable streams to be selected by the Geological Survey with a view to determining the practicability of thus improving and protecting the streams for Federal purposes. I think a moderate expenditure for each year for this purpose, for a period of five or ten years, would be of the utmost benefit in the development of our forestry system.

Advocates of the Weeks bill for the creation of National Forests, with especial reference to the two great Appalachian water-sheds—the northern and southern—rejoice at this distinct endorsement of the measure which they believe, in view of the facts which have been persistently and thoroughly put in evidence during several years of agitation, to be one of the most immediately pressing conservation measures before the country. It is to be noted that in its present form the bill obviates the objection brought against it originally, that it took the income of the western National Forests to buy forests in the East, and makes the appropriation a direct one. The President evidently had the original form of the bill in mind.

It may be in order to suggest to regulars and insurgents alike that opposi-

tion or obstruction to the passage of the Weeks bill will be directed against a policy of the President—a part of the conservation program adopted and put forth by him.

The Appalachian Bill Once More

ONCE again this publication appeals to its readers for aid in promoting the enactment of the Appalachian Bill.

In various forms and under different names, this legislation has long been before Congress. Three times it has passed the Senate and once the House; but again its friends must begin practically *de novo* and perform their first works over.

Clearly, the need for this legislation increases as time passes. The woods are falling, the fires are raging, sand-bars are filling the streams, dams are silting up and damages almost irreparable are, by this long-protracted delay, being effected. But still inertia characterizes the management of our National Legislature.

Not only so, but open opposition is showing its head with a boldness hitherto rarely observed. The paper of Lieutenant Colonel Chittenden together with other hostile literature, adorns the desks of numerous congressmen, plainly testifying that the foes of Appalachian legislation are busy.

This, of course, is in line with events now all too familiar. Readers of this publication know of the series of attacks on the conservation movement and its chief proponents: the failure to provide a modest appropriation for the maintenance of the National Conservation Commission, the attempt, largely successful, to suppress the report of that commission, the astounding Tawney amendment to the Sundry Civil Bill, and the declaration of war, semi-privately then, it is true, on the leaders of the conservation movement, all came months ago. But the tree then planted is bearing its fruit. The work of the Reclamation Service has been discouraged, if not demoralized; the National Forest Service has been deprived of its famous and most ef-

fective head, more conservation literature has been suppressed, water-power bills in the interest of private concerns abound in congressional committee-rooms, the inland waterways movement has been "beared" by the commission which went abroad presumably in its behalf, and it is now but natural to expect that foes of Appalachian legislation will take courage and arm themselves openly for the fray.

That the activity of enemies of this legislation should be met by equal and greater activity on the part of its friends, goes without saying. Good legislation does not enact itself. What the people want they must fight for. If they regard their legislators as their masters, they must be satisfied with such legislation as they can get. If, on the contrary, they regard them as their servants, they must act accordingly and show their faith by their works. Ordinarily speaking, legislators are interested in good legislation only when their constituents are also interested, and tremendously so, in the same. To rely upon Congress to care well for the people's requirements without having those requirements pressed upon Congress by the people, is to rest upon a broken reed. If friends of the protection of the forests in the White and Southern Appalachian mountains desire results at this session, they must promptly bestir themselves. They must state their wants to their senators and representatives in unmistakable terms and in tones that will not accept no for an answer. Thus proceeding, whatever be the form of House organization, or the attitude of the Speaker, they can secure the passage of this bill. Otherwise, it is already doomed, dead, and buried.

The First National Forests

THE inclusion in a report in *Conservation* for October of a statement "that Mr. Cleveland established the first National Forests," brought from Robert Underwood Johnson, of the *Century Magazine*, than whom no one is more conversant with the facts, a letter call-

ing attention to the prior acts of President Harrison's administration. In the reference to Mr. Johnson's letter made in the November number, we hardly did full justice to President Harrison and Secretary Noble for what they did. Now that this work has attained such large proportions under their successors, we must not forget the achievements of the farsighted men who saw the needs and made the beginnings when there was no great popular demand for forestry and conservation. By recalling this we do not in the least minimize the splendid work of to-day. The case is fully covered in an article from *Forest and Stream* of March 9, 1893, which seems like an original source of ancient history, so rapidly are we moving in this twentieth century, and yet it is so recent that the facts should not be forgotten. The article was published under the title "Secretary Noble's Monument," and reads as follows:

We have more than once called attention to the broad and farseeing policy inaugurated by Secretary Noble in the matter of forest preservation in the less-inhabited portions of the country, and it is satisfactory to see that the daily press is now giving him credit for the great work he has done.

It will be remembered that, beginning with the Yellowstone National Park, which was brought to the notice of Mr. Noble early in his administration, he has given much attention to the question of our parks and timber reservations. To say nothing of the Grant, Sequoia, and Tule River parks, the preservation of which we owe almost entirely to Mr. Noble, there were set aside soon after the act of Congress of March 3, 1891, six timber reservations, embracing an estimated area of three and a quarter million of acres. Of these, three lie in Colorado, one in New Mexico, one in Oregon, and one in Wyoming, adjoining the Yellowstone National Park. Besides these forest preserves, Mr. Noble has considered as well the question of preserving our marine mammalian fauna of the Northwest coast, which is so rapidly disappearing under the constant persecution of white men and Indians, and has set aside an Alaskan island as a reservation.

In December last there was established in southern California a timber reservation near Los Angeles, including nearly 1,000,000 acres. This will be known as the San Gabriel Timber Land Reservation, and includes all the mountains from Salidad Canyon, where the Southern Pacific Railroad passes through the mountains, eastward to

the Cajon Pass. A little later another reservation of about 800,000 acres was announced, to be called the San Bernardino Mountain Forest Reservation. This adjoins the San Gabriel reserve and runs eastward from the Cajon Pass to San Geronimo. Finally, the 14th of February, the Sierra Reservation was set aside. This comprises over 4,000,000 acres and takes in the high Sierra, extending southward from the line of the Yosemite National Park to the seventh standard parallel south. It includes the existing Grant, Sequoia, Tule River, and Mount Whitney reservations, and also the wonderful Kings River Canyon, which has been described by Mr. John Muir in the *Century Magazine*.

This country is one of surpassingly beautiful scenery and contains some of the highest peaks to be found within the limits of the United States. It is of especial interest for its giant forests, many of which are yet untouched, and which contain the great sequoias, together with many other species of Pacific forest trees of remarkable interest and beauty. Besides this, the region is interesting as containing a considerable amount of game, and, on the high mountains, species of birds and mammals which are not found elsewhere in California.

Far more important, however, to the country, from an economic point of view, is the preservation of the water supply, which will be insured by the setting aside of these reservations. Throughout most of the western country the question of water for irrigating purposes is the most vital one met by the settler, but it is only within a very few years that the slightest regard has been had to the farmer's needs.

It is proposed before long, we understand, to set aside a tract of about 1,000,000 acres in the state of Washington, which will be known as the Pacific Reservation, and will include Mount Rainier; and in southern Utah, about the Grand Canyon of the Colorado, President Harrison has made another forest reserve of 1,900,000.¹

Much credit is due to Mr. R. U. Johnson, of the *Century*, who has been untiring in the efforts to secure proper legislation for the protection of the Yosemite National Park, and to Messrs. Hague, Phillips, and Roosevelt, who have taken special interest in the Yellowstone Park. All this, however, would have availed little had it not been for the wisdom and farsightedness of Secretary Noble. His broad mind was able to appreciate the needs of this country, and he had the courage to lead public opinion where others would have been content to wait for the popular cry and then obey it. He has set on foot a work that will live long after he has passed away, and if in his administration he had accomplished nothing besides this work of forest preservation, he would have deserved well of his country.

¹These were completed under President Harrison.

NEWS AND NOTES

President Roosevelt's Acknowledgments to Mr. Gifford Pinchot

Recent developments make the following, published in *Conservation* for September last, worth rereading:

"We have been doing everything in our power to prevent fraud upon the public land. * * * So much for what we are trying to do in utilizing our public lands for the public; in securing the use of the water, the forage, the coal, and the timber for the public. In all four movements my chief adviser, and the man first to suggest to me the courses which have actually proved so beneficial, was Mr. Gifford Pinchot, the Chief of the National Forest Service. Mr. Pinchot also suggested to me a movement supplementary to all of these movements; one which will itself lead the way in the general movement which he represents and with which he is actively identified, for the conservation of all our natural resources. This was the appointment of the Inland Waterways Commission."—Address of President Roosevelt before the National Editorial Association, at Jamestown, Va., June 10, 1907.

"All these various uses of our natural resources are so closely connected that they should be coordinated, and should be treated as part of one coherent plan and not in haphazard and piecemeal fashion. It is largely because of this that I appointed the Waterways Commission last year. * * * The reason this meeting takes place is because we had that Waterways Commission last year. * * * Especial credit is due to the initiative, the energy, the devotion to duty, and the farsightedness of Gifford Pinchot [Great applause], to whom we owe so much of the progress we have already made in handling this matter of the coordination and conservation of natural resources. If it had not been for him, this Convention neither would nor could have been called."—President Roosevelt in his opening address to the Conference of the Governors of the United States, White House, May 13, 1908.

Mr. Pinchot's Public Statement

Following his removal from office, Mr. Gifford Pinchot said:

"At this time I have no comment to make on recent events. Whether in or out of the Government service I propose to stay in the

fight for conservation and equal opportunity. Every movement and measure from whatever source that tends to advance conservation and promote government by men for human welfare I shall try to help. Every movement and measure from whatever source that hinders conservation and promotes government by money for profit I shall endeavor to oppose. The supreme test of movements and measures is the welfare of the plain people. I am as ready to support the administration when it moves toward this paramount end as I am to oppose it when it moves away.

"I leave the Forest Service with profound regret. Its growth, its stability, and its success are due to the character, capacity, and hard work of a remarkably devoted, able, and high-minded body of men. I bear eager testimony to the service they have rendered this Nation. They are well prepared to carry on the work. Out of this work of the Forest Service grew the conservation movement, which has taken so remarkable a hold on the Nation. Less than three years ago the word itself, in its present meaning, was substantially unknown and the movement for which it stands had not been born. To-day it expresses one of our deepest National convictions and the principles for which it stands are received as axiomatic. It is only the execution of them which remains in doubt.

"The great Conference of Governors in the White House in May, 1908, led to the appointment of the National Conservation Commission, whose report gave us a new conception of the value of our natural resources. It told us what is needed for their prompt and orderly development and for their safety and perpetuation. Together with President Roosevelt's message transmitting its report, the recommendations of the commission furnished a complete statement of the conservation policy, met our needs squarely and prescribed the remedy. They included definite practical recommendations for the protection of forests against fire and for equitable forest taxation. The classification of the public domain was strongly urged and principles for its use and disposition were laid down. The necessity for preserving the fertility of our soils and developing their agricultural value by drainage and otherwise was covered, and particular attention drawn to the need of retaining our phosphate lands, then in danger of absorption by a foreign syndicate. The separation of mineral rights from rights to the surface

of the land was urged and the leasing of lands valuable for coal and other mineral fuels, under equitable conditions, was recommended. The principles which should govern the development of our waterways for navigation, power, and other uses were laid down, and the broad plan of the Inland Waterways Commission, which first called public opinion to the necessity of limitation in time and proper compensation to the public in grants for water-power, was indorsed. In a word, the report of the commission and the message together set forth a comprehensive, definite scheme for the conservation of our natural resources and included the essential details of all the best that has been proposed since they appeared. We were ready to move forward.

"At this critical period, when the goal was in sight, enemies of conservation in Congress not only succeeded in preventing an appropriation with which to pursue the work, but attempted to forbid its progress by the Tawney amendment to the last sundry civil bill. Thereupon the work of the National Conservation Commission was stopped. The recommendations of the commission still wait for action. All wise men will agree that the situation is serious. The Tawney amendment was more than a mistake—it was a deliberate betrayal of the future. The dangers which confront the conservation movement to-day must be met by positive action by Congress. No action will be equivalent to bad action and will have the same results. Unless Congress acts the water-powers will pass into the hands of special interests without charge and without limit of time. So with the phosphate deposits on public lands when the withdrawals which now protect them are removed. So with the enormously valuable coal deposits in Alaska, which the present law would sell for \$10 per acre.

"The danger of bad legislation is no less serious. The special interests must no longer be allowed to take what they choose out of the great property of all the people. Those who steal public lands steal homes from men and women who need them. Congress can stop the pillage or Congress can let it go on. In the absence of proper action, two great conservation plans for the public welfare may fail. The first is the control of water-powers on navigable streams in the public interest. The second is the construction of the deep waterway from the Great Lakes to the Gulf. The unanimous opinion of the Mississippi Valley recognizes this waterway as a commercial necessity. It believes with reason that the cost which is already officially known will be trivial when compared with the benefits conferred. Transportation facilities create traffic. The failure to develop our waterways, together with adequate terminals and connections by rail, leaves to the railroads a complete monopoly of transportation in the Mississippi Valley.

"The conservation of natural resources and the conservation of popular government are both at stake. The one needs conservation no less than the other. It is the duty of every man of good will to make known without delay to his representatives in the House and Senate his firm intention to hold them responsible for safeguarding the rights and property of the people. The remedy lies there. The first great, immediate danger is that the water-powers will be lost; the second, that the coal lands will be lost. But these specific dangers of public loss are merely parts of the great issue between the special interests and the rest of us. That issue is whether this country shall be managed by men for human welfare or by money for profit. It is a tremendous moral issue, far greater than any man's personal feelings or personal fortunes. It lies between the people and their representatives on one side and the interests and their representatives on the other; between progress and reaction; between special privilege and a square deal. I repeat that the supreme test is the welfare of the plain people. It is time to apply it."



Where Does He Stand?

The labored explanations by which the President attempts to justify himself in his letter to Mr. Gifford Pinchot dismissing him from the Forestry Service are not likely to affect materially the public judgment. Mr. Pinchot may have been indiscreet in allowing it to be seen so clearly where he stands in the controversy over the attitude of Secretary Ballinger toward the policy of conservation; he may even have been technically "insubordinate" in writing a letter to Senator Dolliver. But the general realization of the immense value of his service to the country will suffice to brush away all these finespun cobwebs. The verdict will be that the President has cast his lot with the enemies of conservation, and no amount of argument will bring conviction to the contrary.—*Providence Journal*.



The Beginning of a Fight

If there is in the United States a public land or timber grabber or a plunderer of water power sites who is not wearing a broad smile of satisfaction today it is because he has not learned the news from Washington. President Taft's summary dismissal of Gifford Pinchot is the greatest thing that happened to these gentry since they began operations on the public domain, and it is safe to say that every one of them threw his hat in the air and hip-hurrahed when he heard of it. There are all sorts of officials in the Government service, but Pinchot was of the sort that can not be bribed, bullied or cajoled from a course of honor and honesty. So long as he stayed on the

job everybody that had dealings with the Forest Service had to play the game square or get in trouble, and it is a matter of history that a good many of them were in trouble all the time. So much for the Forest Service as it was created and conducted by Gifford Pinchot; what it will be in the future is likely to be another story, especially if one Richard Achilles Ballinger has anything to say about it.

* * * * *

The Forest Service is deprived of the man who is really responsible for its existence, who planned and built it up little by little and made it the most effective force in the Nation to-day for the preservation of an important share of our National wealth, the man who also originated and worked out the chief monument of the Roosevelt administration, the conservation idea. Rightly or wrongly, his removal from office is construed as the severance by Mr. Taft of the last cord that binds the present administration to its predecessor.—*Colorado Springs (Col.) Gazette*.

* * *

Informing the Senate

There is a point in the affair of Pinchot against Taft which I have not seen touched on by the press. His letter was not addressed to a newspaper, but to an Iowa senator seeking information. The Senate is a branch of the National Government co-ordinate with the President, and, in fact, prior to him, for there was a Senate, presided over by John Langdon, before there was a President Washington or a Vice-President Adams. Now, Pinchot does not seem to be charged with falsehood in his letter to Dolliver. The point, therefore, is that an officer appointed by the President and Senate has been swiftly removed for communicating true facts to a member of the Senate, from which he received confirmation of his right to hold office. Is that an offense under our constitution of checks and balances? The question is coming up in the Navy Department, when the Senate, through its committee, asks questions of an admiral who has been ordered not to give answers. The power of the Senate to compel answers in a matter bearing on its regular duties, is unquestioned, I think. My refusal to answer in a matter where the Senate was acting outside of its jurisdiction had a different basis. Cannot, then, an individual senator ask a question and receive an answer in matters of fact without subjecting the official to removal for that answer? I apprehend that the Senate, if it made that point against the President,—as it virtually did against Johnson when President, would be supported by the constitutional lawyers and by public opinion. The country is always in more danger from the

usurpations of a President than from those of the Senate, which has so little power to enforce its orders.—Correspondence in *Springfield (Mass.) Republican*.

* * *

Turn on the Light

But from now on the thing for all right-minded men to insist upon steadily is the duty of sticking to the real point. That does not concern itself with personal consequences or political effects, but with the great Governmental policy which lies behind the whole controversy. Chief Foresters and Secretaries and even Presidents may come and go; parties may be split and beaten; but what the people will demand is that the public resources be kept for public uses, and not permitted to be filched away by designing and tricky men. To this end, the congressional inquiry must be searching and fearless. There is redoubled reason now for laying the whole truth bare. Anything like a halting or whitewashing investigation would be certain to rouse popular suspicion and wrath. Hence we can but hail the action of the House yesterday in taking from Speaker Cannon the right to appoint the representatives who are to serve on the joint committee of inquiry. It is no time for a packed committee. Its members should be the most untrammelled and uncompromising men to be found, who will tear out the very heart of the business. Nothing should be allowed to hinder or prejudice that result. Although Mr. Pinchot has grievously erred, he will still be in a position to set forth the great cause and to champion the people's rights; and the investigating committee will be bound to afford him and every other honest man the fullest opportunity both to meet his enemies and to vindicate the vital and imperiled policy.—*New York Post*.

* * *

The Irrepressible Conflict

There is something more vital in this so-called Ballinger-Pinchot controversy than a mere matter of difference of opinion as to the proper way to run the office of the Secretary of the Interior and that of the Forestry Bureau, or of official etiquette, the basis of Pinchot's dismissal. It is a phase of the irrepressible conflict between the people and monopoly, and for the nonce the champion of the people is Mr. Pinchot. It is not at all likely that any violation of law on Mr. Ballinger's part will be discovered in the investigation, and it would be quite possible for the committee to "vindicate" him, as did the President, of any illegal wrongdoing.

The real charge against Mr. Ballinger is that he is administering his office—under the forms of law, to be sure—in the interest of those who desire to secure monopoly control of the country's natural resources, and

is not seeking to preserve to the people their interest in them now and for the future. This is nothing new. Mr. Ballinger has discovered no new way of separating the people from their property. His predecessors have accomplished much in the same direction, though it is possibly true that none of them entered office to pass administratively upon the claims of those for whom he acted as an attorney prior to taking the office. This alone is sufficient indictment of Mr. Ballinger as an unfit person to control the handling of the public domain. It is the wide administrative discretion the law gives to the Secretary of the Interior which enables him, strictly in compliance with it, to make the administration of the law hostile to the public interest and favorable to private interests. It is this which Pinchot is fighting, and he will not cease to fight so long as the people give him support.

Mr. Ballinger is a western man, and he is imbued with the grab-it-all-now spirit which pervades the West with relation to the public domain and the natural resources of the country. The West—particularly the western city—wants to grow. It wants to grow rapidly. It wants every dollar that can be taken out of the country's natural resources taken as soon as possible, in order to promote this rapid growth. Perhaps no better exposition of this purely selfish attitude, this desire for temporary advantage from the consumption of the country's resources regardless of the future or of their monopolization in private hands, has been given than the editorial treatment of the subject in the *Portland Oregonian*, under the head of "The People's Heritage," put in quotation marks in the heading to show its use sarcastically.

The theme of the article is that the resources of the West belong to the western people and they should be given free access to them. "The West desires development," it says. "It insists that the natural resources shall be used."

Its whole argument is the sophistical one that because in the past the public domain and resources have been permitted to pass easily into private hands and come under monopoly control and are in the East thus largely owned, the policy should be continued and the remainder be squandered in the same way as a matter of equity and justice to the West and to aid in its development.

This argument is no better than the one that because in the past municipalities gave away their franchises without compensation and with monopoly provisions which have left citizens in the grip of public-service corporations, they should now continue to do so; yet the *Oregonian* has long been an earnest advocate of municipal reform in the matter of franchise granting. That it does not also advocate reform in the matter of giving away the public patrimony, what it sarcastically calls "the people's heritage," is

solely due to this mania for growth that obsesses the entire West and blinds it to the public welfare in future years.

Because he ably represents this grab-it-all-now spirit, Mr. Ballinger finds his chief support in the extreme West, and Mr. Pinchot, who contests it, finds there his chief criticism. The people of the United States should make no mistake in this matter. In so far as the Taft administration makes itself responsible for Ballinger and his western ideas of passing the public property as speedily as possible into private hands, it is on the side of monopoly and what is broadly called "the interests," and against the masses and the real welfare of the people in future years. This is but one phase of the everlasting fight of the people for their own protection, and the people ought to know and to show where they stand in it.—*St. Louis (Mo.) Star*.

Pinchot Speeches to be Compiled

All the literature available on the conservation of natural resources, including the speeches of Gifford Pinchot and former President Roosevelt, will be printed and bound together for the use of members of Congress when the fight for conservation legislation comes up on the floor of the House. This was ordered by the House Committee on Interstate and Foreign Commerce today, and it was decided to push conservation legislation this winter.

Representative Mann, chairman of the committee, who is the author of a conservation bill, has stated that his committee has about decided upon the main features of the water-power law, and that it will be reported as soon as President Taft's message on conservation comes from the White House.

Pinchot Chosen President

The election of Gifford Pinchot to succeed Dr. Charles W. Eliot as President of the National Conservation Association was announced to-night. Doctor Eliot, at whose suggestion Mr. Pinchot was elected, retains the honorary presidency. Mr. Pinchot will take active charge of the association tomorrow. Headquarters will be in Washington. * * *

Two weeks ago Doctor Eliot wrote to the executive committee of the association expressing his opinion that Mr. Pinchot, as the recognized head of the conservation movement, should take the active leadership of the Conservation Association. He also wrote Mr. Pinchot a personal letter suggesting that he accept the presidency. At Doctor Eliot's direction, a meeting of the executive committee of the association was held and Mr. Pinchot was formally elected.

The National Conservation Association was formed last July at a meeting with Doc-

tor Eliot in Cambridge, Mass., with the purpose of helping through a large individual membership to put into practical effect the conservation principles declared by the Conference of Governors at the White House in May, 1908. The association was launched formally last October, since which time, under Doctor Eliot's personal direction, it has secured a membership extending pretty generally over the country. It is announced that an active campaign to extend that membership into every state and territory will be carried on vigorously.

The conservation association has been making a study of conservation needs and is prepared to recommend needed measures, both Nationally and in the several states. Mr. Pinchot said to-night:

"The pleasantest thing about my election as president of the National Conservation Association is that I follow Doctor Eliot by his own desire. It is most fortunate that he will remain in the work as honorary president. I appreciate keenly both the honor and the chance to help the movement.

"The National Conservation Association is not in politics. It believes that conservation is a great moral issue, broader than any party or section and more vital than any political question or measure now before us. The rights and the property of the American people are at stake. This association will be on the firing line in the conservation fight. Its immediate task will be to do what it can toward getting good conservation laws in Congress.

"Hereafter I expect to devote what energy I have to the association as I did to the Forest Service in the past. I believe the National Conservation Association offers the best way to help the cause of conservation. In behalf of the association, I ask for the active help, membership and influence of every man and woman who believes in conservation and equal opportunity. They are needed, and needed at once."—Telegram to *New York Sun*, January 23, 1910.



Should Reclaim the Swamp Land

The great possibilities that may be obtained from the reclamation of the immensely rich and neglected swamp lands of the south are told in a letter to G. A. Cole, president of the Farmers' Union, by B. F. Yoakum, the widely known railroad man, who is urging the southern people to interest the Government in doing things for the agricultural advancement of their section.

Mr. Yoakum's letter deals with the importance of the drainage of these swamp lands, which he demonstrates are more deserving, if anything, than the reclamation of the arid lands of the West. Although drainage is much less costly and produces

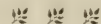
greater results, the Government has been induced to appropriate \$114,000,000 to reclaim arid lands by irrigation, while not one cent has been expended for the reclamation of the great swamp lands of North Carolina, Virginia and other southern states. These and other interesting facts are set forth by Mr. Yoakum, whose letter on the subject is regarded as the strongest word yet expressed for the redemption of these neglected swamp lands of the south. The matter is one that is interesting southern congressmen.

Mr. Yoakum's letter, in part, follows:

"When we enter fashionable hotels and restaurants in New York, Chicago and other cities, and order half a cantaloupe at 35 or 40 cents, and oranges, grapes and luxuries from expensive, irrigated farms, transported 2500 miles by rail, we do not have to count the cost, but the wives of millions of the working classes must consider every penny that is expended for food.

"There are in the Mississippi Valley 25,000,000 acres of land, an area equal to the state of Kentucky, with as rich and as productive alluvial soil as can be found anywhere in the world. The Government's bureau of drainage has made several surveys of districts in Arkansas, Mississippi, and Louisiana, and its estimates of the cost of drainage of these lands ready for cultivation is an average of \$4.86 per acre.

"On the assumption that the Mississippi Valley would be divided into farms of an average size of eighty acres, which would provide 312,500 farmers with comfortable homes, and that there would be seven persons, including children, to the farm, it would increase the population of that section 2,200,000, which would be added to by the population of numerous thrifty towns. These lands would immediately appreciate in value over their present figure not less than \$30 an acre, a total increase of \$750,000,000 on land values alone, to say nothing of the farm machinery, live stock and other property that constitutes a thrifty farming community. The annual products of the Mississippi valley awaiting drainage, at the low average of \$20 an acre, would be worth \$500,000,000 annually to the farmers cultivating these lands."—*Oakland (Cal.) Tribune*.



No Forest Encroachments

In the annual report for his department just issued to the President, Secretary of Agriculture James Wilson makes some statements that are of especial value just now and which, to use his own words, refer to an impression that has gained wide currency, to the effect "that the National Forests contain large areas of agricultural land to the exclusion of settlement and large areas of untimbered grazing land unjustifiably brought within the National Forest bound-

aries for the sake of grazing." With reference to this report and the impression it has produced, the secretary says: "To satisfy myself on the ground as to the facts, I made personal investigation of these matters during the past summer in the states of Idaho and Wyoming. Presumably the time will come when some portions of the present forests can with benefit to the community be converted into farms. Through dry farming, plant breeding, and the introduction of new forms of useful and drought-enduring vegetation, agriculture is steadily gaining upon the desert, and may be expected to gain on the forest in semi-arid regions. Growth in population also will bring an increasing demand for farm land. But it will also bring an increasing demand for timber and water conservation. The present is not the time to decide where the line should finally be drawn.

"I found no evidence that the National Forests are withholding from settlement land now demanded for agriculture. As to grazing land, it is sufficient to say that proper administrative control of National Forest grazing has necessitated the fixing of the boundaries where they now are, that public sentiment in the states visited is strongly in favor of the maintenance of the existing boundaries, and that representations that great areas of land are held for other than forest purposes are in my judgment wide of the facts."

When tracts of land suitable for agriculture are found scattered in the National Forests, they are always, contrary to the belief of many, opened to settlement under the act of June 11, 1906, and the secretary says in his report that nearly 1,500 homesteads, with a total area of 140,000 acres, were listed during the last fiscal year. That ought to dispose of the yarn of National Forest encroachments but probably it will not, as those interested in circulating the report are aware that "a lie well stuck to is sometimes as serviceable as the truth."
—*Bridgeport (Ct.) Standard*.



Water Right Guarantees

The settler in any of the arid or semi-arid sections of the west, where irrigation is required in the growing of crops of whatever kind, should in the purchase of land be most particular in regard to the water rights which go with it. He should see to it first of all that the parties back of the irrigation system are absolutely reliable and above even the suspicion of crookedness and dishonesty. A government irrigation project is reliable in the matter of its water guarantees, for no more land is sold than the engineers are positive can be adequately supplied with water when moisture is needed. There are some private irrigation companies whose guarantee is just as good, but there are many other projects where

land is being sold at long prices in which water could not be furnished in sufficient quantities at the critical time if one were to wait till he became gray headed. Water in the ditch between November and May, when it is not needed or used, is a different thing than little or no water from May to October, when it is needed; hence when irrigated land is bought the guarantee of the water privileges must be in the most direct and plain terms, so that no loophole will be left through which the guarantors may evade furnishing a service for which they are duly paid. It may be a nuisance to have to look after this matter, but attending to it at the proper time will mean a lot less grief later on.—*Salem (Mass.) Observer*.



On a Great Scale

The great state of New York manages its forestry department on a scale commensurate with its size and resources, a scale at which New Hampshire can only gaze with envious eye.

A comparative statement between the years 1904 and 1909 indicates the present increased efficiency of the department. Total receipts have increased \$204,000, while the increase in expenditures has been \$111,000, of which \$60,000 is due to the cost of a new fire system and the game bird farm. The increase in the number of fish reared and distributed is 418,000,000. Three nurseries have been enlarged from one and one-half acres in 1904, when Commissioner Whipple entered the department, to twenty-eight and one-half acres. The number of trees grown has increased over two millions; the number of trees sold to private land-owners last year was one million; in 1904 there were none. During this time the state has purchased 201,000 acres of land and contracted for 47,000 acres more.

However, Commissioner Whipple says that five times as much wood is being taken from the forests of the state each year as is growing up, and that if present conditions are permitted to continue there will be both a wood and water famine. He believes that the people should plant for many years, beginning now, at least 50,000,000 trees a year, and that the state should immediately acquire 1,000,000 acres of land in the Adirondacks and 400,000 acres in the Catskills in order to stop the destructive work of lumbermen.—*Concord (N. H.) Monitor*.



Conservation in New York

A rill of the conservation movement has flowed into the public affairs of New York. The state engineer reports that there are eighteen hundred miles of rivers and streams within its jurisdiction usable as

public highways which appear to be under the supervision of no public department. These have an aggregate length of eighteen hundred miles, and could be utilized much more than at present for transportation purposes. What moves the state engineer to recommend some systematic conservation of these streams is not their availability for internal communication so much as the imminent danger of their being "usurped for private purposes." He suggests some bureau be established whose license shall be required to enable the establishment of power sites on terms equitable to the community and guarding the public's rights.—*Boston Transcript*.



Commissioner White on Forest-reserve Battle

Railroad Commissioner Clinton White, who is back in Boston to-day after attending the meeting of the National Board of Trade in Washington, says that he went to the board meeting especially in the interest of the White Mountain forestry-reserve project, although he was interested and active in other matters relating to New England.

The committee on forestry and irrigation, of which Mr. White is chairman, presented a set of resolutions in favor of Government Forest Reserves which were accepted by the board and which place the board on record as in favor of Congressman Weeks' Forest-reserve Bill. The resolutions were drawn up by W. S. Harvey, of Philadelphia, a member of the committee, however, Mr. White was careful to point out.

With the resolutions was a careful report on the forestry situation in the United States which the committee had prepared and which was also adopted by the board. This report shows the necessity of preserving the forests that are on the headwaters of the streams which have their origin in the southern Appalachian and White Mountain region.

The report recognizes the great value, and approves the work of the Forest Service, and expresses the belief that within a few years the income from the National domain will be largely in excess of the cost of administering this valuable asset of the people. It approves also the proposed issue of \$13,000,000 bonds to complete the reclamation and irrigation projects in the West.—*Christian Science Monitor*.



Sewage Disinfection

The problem of purifying sewage so that it no longer transforms the rivers into which it is discharged into open sewers has been so far solved that these streams need no longer be disgusting to the senses and dangerous to the health of people living along them. The task of destroying the disease-breeding bacteria in the sewage and once

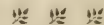
more making the rivers available for drinking water has not yet been worked out on a practical basis, but investigations recently made by the United States Geological Survey in cooperation with the Sanitary Research Laboratory of the Massachusetts Institute of Technology and local authorities at Boston, at Baltimore, and at Red Bank, N. J., show that this end, too, may be attained at a reasonable cost.

The essential agents of sewage purification are provided and employed by nature, and sewage purification as practised to-day is but the intensive application of these natural processes. The improvements that have been made have not involved the discovery or application of new principles, but have merely increased the working efficiency of the natural agencies. From the old-time sewage irrigation field, with its maximum capacity of possibly 10,000 gallons an acre in twenty-four hours, to the present-day trickling filter capable of dealing with two or three million gallons an acre a day, improvement has been steady.

The old-time methods, however, really destroyed the polluting substances, while the modern sewage filter does not. The liquid flowing from these filters looks to the untrained eye like the original sewage. There is almost as much organic matter in it as in the raw sewage, and sometimes more. Its nature, however, has been changed; the organic matter, though not burned up, has been charred or partly oxidized, and this charring has been sufficient to rob it of its foulness. In other words, its chemical composition has been so altered that it can no longer undergo rapid putrefaction and cause a nuisance.

The water, however, still needs filtration to make it fit to drink. Moreover, it may and in many cases does contaminate oyster beds, thus spreading disease and tending to ruin a great industry.

It has not yet been decided upon whom the responsibility rests for keeping the rivers clean, but the consensus of competent opinion requires that if sewage is discharged within the region of important shellfish beds, or into a stream which is used as a source of domestic water supply without filtration, such sewage shall at least be free from disease-bearing germs.



Vanishing Food Fish

The prodigal waste practised by the American people is well illustrated in the extermination of some of the food fishes of our streams, and long ago the Federal Government undertook to restock waters that half a century ago abounded with many families of the finny tribe. It is doubtless true that the shad would be as nearly extinct as the sturgeon if Government hatcheries had not partially restored that fish to the tables of a comparatively few American citizens.

The destruction of fish by dynamite goes bravely on in contempt of the law, as does

illicit seining and trapping. The farmer who would cut down an apple tree to harvest its crop is no more improvident than the man who would dynamite a stream for a string of fish.

But the main cause of fish extinction is the wanton destruction of forests. Thus clear and placid rivers and brooks are turned into muddy and raging torrents in time of spring floods, and billions of eggs and young fry are buried in the sand-bars that appear when the waters subside.

Every state has laws for the protection of fish, but little effort is made to enforce them, and daily and hourly they are violated with impunity. Where fish are abundant and cheap the price of meats is regulated and kept in bounds by the laws of competition and supply and demand.

It is stated that our streams are to be restocked with sturgeon from the Danube, and another very excellent fish of that historic stream, the sterlet, esteemed even superior to the Potomac shad, and, unlike that king of fish, it does not migrate, but remains in the waters where it is hatched.

But if the work of deforestation continue and the waters become thick with mud at spawning time, what chance will these desirable immigrants have in our rivers? They will not thrive, however hardy they may be. The late Seth Green held that an acre covered with water ought to be more profitable than an acre devoted to agriculture, and it would be if adequately stocked with fish and edible reptiles, and the waters providently conserved.

But the first thing in order is to enforce the laws of the states enacted for the protection of fish.—*Washington Post*.



Conservation in Colorado

The Colorado Conservation Commission publishes the state forestry laws relating to fires in a four-page folder, introducing it with the following paragraph:

"Every one in pursuit of business or pleasure, in the mountains of Colorado, is interested in the following laws, and so are all sheriffs and county commissioners."

An accompanying folder by the commission says:

"The Colorado Conservation Commission was appointed by Governor Shafroth by the request of the President of the United States and chairman of the National Conservation Commission, on the 17th day of February, 1909, consisting of thirty-six members, twenty-one of whom had been appointed by Governor Buchtel on November 28, 1908. In both commissions Hon. Frank C. Goudy was designated as chairman.

"The commission met March 11, 1909, for organization."

The following is taken from another circular issued by the commission:

"It is not the purpose to interfere with any legitimate use of our natural resources, but

it is proper and necessary for the commission to know if any person, company or corporation is using them unlawfully, or with undue prodigality and waste; hence, in order that the secretary may discharge the duty imposed, he earnestly requests that you will supply him with any information of the sort indicated below which may at any time be in your possession, to-wit:

"1. Is any one unlawfully taking timber from any of our state lands, or from the public domain?

"2. Do you know of any lands the title to which has been acquired by unlawful means, and do you know of any attempts to acquire title to public lands by such means?

"3. Are our forestry laws relating to camp-fires, forest fires and their extinguishment, being properly enforced?

"4. Do you know of any instances of wasteful methods of lumbering where the young growth is unnecessarily destroyed, or where remnants of trees are left to waste that should be more economically utilized, and where slash and debris are left to invite fire?

"5. Do any of our birds need better protection? If so, what species in particular?

"6. Do our laws relating to forestry, game or birds need amending? If so, make particular mention wherein.

"7. Are any species of wild flowers in danger of extinction? If so, what ones, and from what cause?

"8. Are any of the old 'cliff dwellings' within the state being defaced or plundered by tourists and relic hunters?

"9. Is any of our natural scenery being defaced?

"10. Do you know of any cases of soil erosion as a consequence of deforestation?

"11. Do you think of any other matters of vital importance to the public which should be brought to the attention of the commission?

"Please carefully consider the above questions and give the commission the benefit of any facts or suggestions you may deem useful. All public-spirited citizens are desired to assist."

Mr. W. G. M. Stone is the secretary of the commission. Address, 1325 Corona Street, Denver.



The Telephone a Protector against Forest Fires

Maine has introduced the modern telephone into her forests, together with a system of forest patrols and look-outs. A watchman is stationed at the top of a mountain or high point of land in the district assigned to him and where usually a single line is run to the nearest telephone office. At the top of the mountain a telephone enclosed in an iron case is used, a case of this metal being necessary, due to the fact that ledges and rocks are usually found there which would make the erection of a small building to enclose a wooden telephone expensive if not impossible.

A watchman, continually on the alert, and using field glasses, is able to view for miles in all directions, and on discovering smoke or fire, telephones immediately to the telephone office, where lines radiate in every direction. The operator at the latter place can promptly and easily warn farms equipped with telephones or communities of the approaching fire, and, in addition, summon help from various points. Frequently, before a community is aware of the nearness of a forest fire, the ringing of the bell calls the farmer to the telephone line, and he, in turn, others, affording them ample time to remove their families to a place of safety and to check the progress of the flames before they approach dangerously near.

In addition to the watchman or look-out, men are employed to patrol the forests, usually carrying a very efficient portable telephone of light weight. The latter may be readily attached to lines which are to-day found in nearly all parts of the forests of northern and central Maine and which run to various camps or exchanges in villages or towns.

In the heart of the hunting and fishing country many camps, especially up-to-date ones, have telephones and lines running to the nearest exchange. These lines are, of course, of great assistance to the patrolmen, who familiarize themselves with their location and reach them easily and quickly on discovering a fire. Without these lines installed by campers and usually left the year round, and, of course, those built by the forest commissioner, the patrolman would be compelled to travel miles before being able to find a line to which he could attach his portable set and warn a community and summon help.—*Bangor (Me.) Commercial*.



The Beginning of Forestry in the United States

When did the United States begin the practise of forestry?

While Washington was serving his first term as President, a recommendation came to him that the Government ought to buy live-oak islands on the coast of Georgia to make sure of a supply of ship timber for war vessels. The idea appears to have originated with Joshua Humphreys, whose official title was "Constructor of the United States Navy," although about the only navy then existing was made up of six ships on paper, and not one stick of timber to build them had yet been cut. The vessels were designed to fight the north African pirates.

Five years after the recommendation was made Congress appropriated money to buy live-oak land. Grover and Blackbeard islands on the coast of Georgia were bought for \$22,500. They contained 1,950 acres.

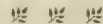
Louisiana was bought soon after, and in 1817 the Six Islands, of 19,000 acres, and containing 37,000 live-oak trees, were with-

drawn from sale, and set apart as a reserve. In 1825, Congress appropriated \$10,000 to buy additional live-oak land on Santa Rosa Sound, western Florida, and subsequently other Florida timberlands, aggregating 208,224 acres, were reserved.

Up to that time nothing more had been done than to buy or reserve land for the timber growing naturally upon it; but the work was to be carried further upon the Santa Rosa purchase. The plan included planting, protecting, cultivating, and cutting live oak for the navy. That timber was then considered indispensable in building war vessels. Much had been said and written of the danger of exhaustion of supply. Settlers destroyed the timber to clear land, and European nations were buying large quantities for their navies. In response to repeated warnings, the Government finally took steps to grow timber for its own use.

Young oaks were planted on the Santa Rosa lands. Difficulty was experienced in inducing young trees to grow. The successful transplanting of the oak is not easy, unless done at the proper time and in the right way. The plantations at Santa Rosa were generally unsuccessful; but large quantities of acorns were planted, and a fair proportion of them grew. But the chief efforts were directed to pruning, training, and caring for the wild trees. Thickets about them were cut away to let in air and light.

What the ultimate success of the forestry work would have been cannot be told. The civil war brought a complete change in war vessels by substituting iron for wood. Forestry work stopped. The timber reserves were neglected. Squatters occupied the land. After a number of years all the reserves, except some of the Florida land, were opened to settlement.



Tardy Action to Prevent Forest Fires

Under a law passed last winter, the state of New York has established the first four fire-fighting stations with permanent employees in the Adirondacks. It may be captious to remark "better late than never," or that it is somewhat like "locking the stable door after the horse is stolen." Any one who has seen the Adirondacks after last summer's reign of devastation will wonder what the wardens are to save from fire. Future generations among the bare hills of the Adirondacks, when the value of forest lands, for water-power, soil-saving and flood-prevention is generally known, will ask what would have been the result if prevention instead of protection had been employed. They will inquire, perhaps, what would have happened if the railways had been made to burn oil, or use electricity, or pay for the damage the sparks from their locomotives began. They will wonder at the carelessness of the public in letting fires start at all, or not fighting them when they got headway, as was the common attitude a few years ago.

However pitiful the remnant of this once noble forest is, the law is a glimmer of reaction against chronic American carelessness and waste, and its enforcement for the sake of a national playground that it is still not too late to save.—*Newark (N. J.) News*.

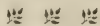


The Use of Peat in Alaska

The high price of coal and other fuels in Alaska, due to the fact that they have to be taken from a distance to the more remote regions away from water transportation routes, makes it advisable to consider the possibility of utilizing peat, great areas of which are common in the territory. More than 10,000 tons of this fuel are prepared and used annually in the countries of northern Europe, while in the United States and Alaska not 1,000 tons were used in 1908.

Peat is partly decomposed vegetable matter that is intermediate in character and fuel value between wood and coal. When properly prepared and air dried, it burns freely and gives off more heat than the best wood, but not so much as bituminous coal of good quality. The chief difficulty in using it for fuel is that it is always saturated with water as it is found in the beds, and has to be dried before it can be burned. The drying can be done most cheaply by exposure to the wind and sun. Machines for drying and shaping it into bricks are in common use in Europe, and peat thus prepared makes a more desirable fuel than cut peat, though it is somewhat more expensive.

In the expectation that the great stores of fuel in the peat beds of Alaska may be used to some extent, C. A. Davis, of the United States Geological Survey, has written a paper describing the different processes of preparing peat for fuel (so far as they are applicable to the conditions existing in Alaska) and stating the cost of these processes.



Reforestation Burned-over Areas

An investigation as to the practicability of reforesting the great areas of forest lands which have been devastated by fire and which are now lying barren and unproductive, is now being carried on by the United States Forest Service in the Olympic National Forest in Washington. The area selected for the experiments comprises several thousand acres on the Soleduck River, and was at one time covered with a magnificent forest of Douglas fir. It was first burned over in 1890 and again in 1895. A third fire over almost the same area occurred in 1906, destroying the last remnant of the original forest, leaving the entire area treeless.



Big Timber Operation on Bad River Indian Reservation

With brush-burning just completed on the Bad River Indian Reservation in Wisconsin under the supervision of the United States

Forest Service, the largest timber operation in that part of the Lake States for a great many years is brought to a close. Following the disastrous fires throughout the north woods during the summer of 1908, it was evident that logging operations must be extended over the Bad River Reservation on an enormous scale to save the timber which was fatally burned by these fires. Accordingly, the J. S. Stearns Lumber Company contracted to log all of the burned timber of the reservation.

Twenty-six logging camps were established on the reservation, and the average number of men employed was about 3,000. Thirty-one scalers were required to do the scaling, and they were constantly check-scaled by three inspectors directed by the Forest Service. The greater part of the logs were hauled to Bad River, which became jammed with logs for about forty miles. To manufacture this immense cut of small logs, the J. S. Stearns Lumber Company found it necessary to purchase two sawmills in addition to their own, and to contract with three other sawmills situated on Lake Superior in the vicinity of Ashland.

By the method of brush-burning employed it will be practically impossible for fires to spread so extensively as in the past. By a contemplated cooperation with the J. S. Stearns Lumber Company, it is planned to hold a sufficient force available to combat any fire which may start on the reservation during the summer season, and with the assistance of the fire lines made by burning a wide strip adjoining green timber, it is probable that loss from fire on the reservation will be reduced to a minimum.



Forestry and Unemployment

In a recent address Rider Haggard, the author, stated that he believes afforestation will do away with a vast amount of unemployment. It had become apparent in the minds of the English people that something should be done to repair the wastage of their woods. The royal commission has found that afforestation was both practicable and desirable, and that it ought to be profitable to the state. If the full scheme suggested by the commission—that 9,000,000 acres should be afforested for eighty years—at the end of that time the state should have a property worth over \$2,500,000,000, that amount being nearly \$500,000,000 in excess of the cost incurred in creating it, allowing three per cent compound interest upon the cost. At the end of that period the state should have an income of \$85,000,000 or \$90,000,000 a year clear profit, * * * and eventually give employment to at least 90,000 men.—*American Cultivator*, Boston, Mass.

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is a national organization composed of public-spirited citizens who are interested in the prevention of the wholesale destruction of our forests, in forest extension and utilization, and in the fullest cooperation of national, state, municipal, and private agencies for these purposes. The Association has no business or governmental ties or alliances. Its work is to educate the people to know and understand the value and necessity of forests in the Nation's life and the way to maintain them to the best advantage through scientific forestry; and to bring about such wise legislation as will best secure the desired results. It is the people's forestry advocate and the representative of forestry before the people.

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MAGAZINE DEPARTMENT.—This department publishes **American Forestry**, the only popular monthly magazine of national circulation in its field. It has a strong force of editors and contributors and is well illustrated. The subscription price is *two dollars* a year.

EDUCATIONAL DEPARTMENT.—Series of educational and general bulletins and leaflets will be issued at intervals. These will be sent to all members and will be provided for distribution at a nominal cost. The first numbers of the general series are a brief summary of the history and need of the project for National Forests in the southern Appalachian and White mountains; the record of the vote on the Weeks bill, looking to that end, in the Sixtieth Congress; and a part of the argument for the Appalachian forests by the President of the Association, Hon. Curtis Guild, Jr., in his annual address for 1910.

LECTURE SERVICE.—It is proposed to establish a lecture service through which reliable lecturers upon forestry subjects may be obtained. This bureau will arrange with able lecturers at central points who will be available for lectures, with illustrations if desired, before clubs, associations, boards of trade, or general audiences.

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The development of these lines of work to their highest usefulness requires the maintenance of a considerable staff and an expensive plant. Contributions for the work, or for any particular phase of it, are always welcome. The income of the Association by which its general work is supported is derived from membership fees, which are as follows: **Annual members, one dollar yearly; contributing members, ten dollars yearly; sustaining members, twenty-five dollars yearly; life members, one hundred dollars, and patron members, one thousand dollars**, the two latter being exempt from further payments.

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The office is at 1417 G Street N. W., Washington, D. C.

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To EDWIN A. START

Secretary American Forestry Association

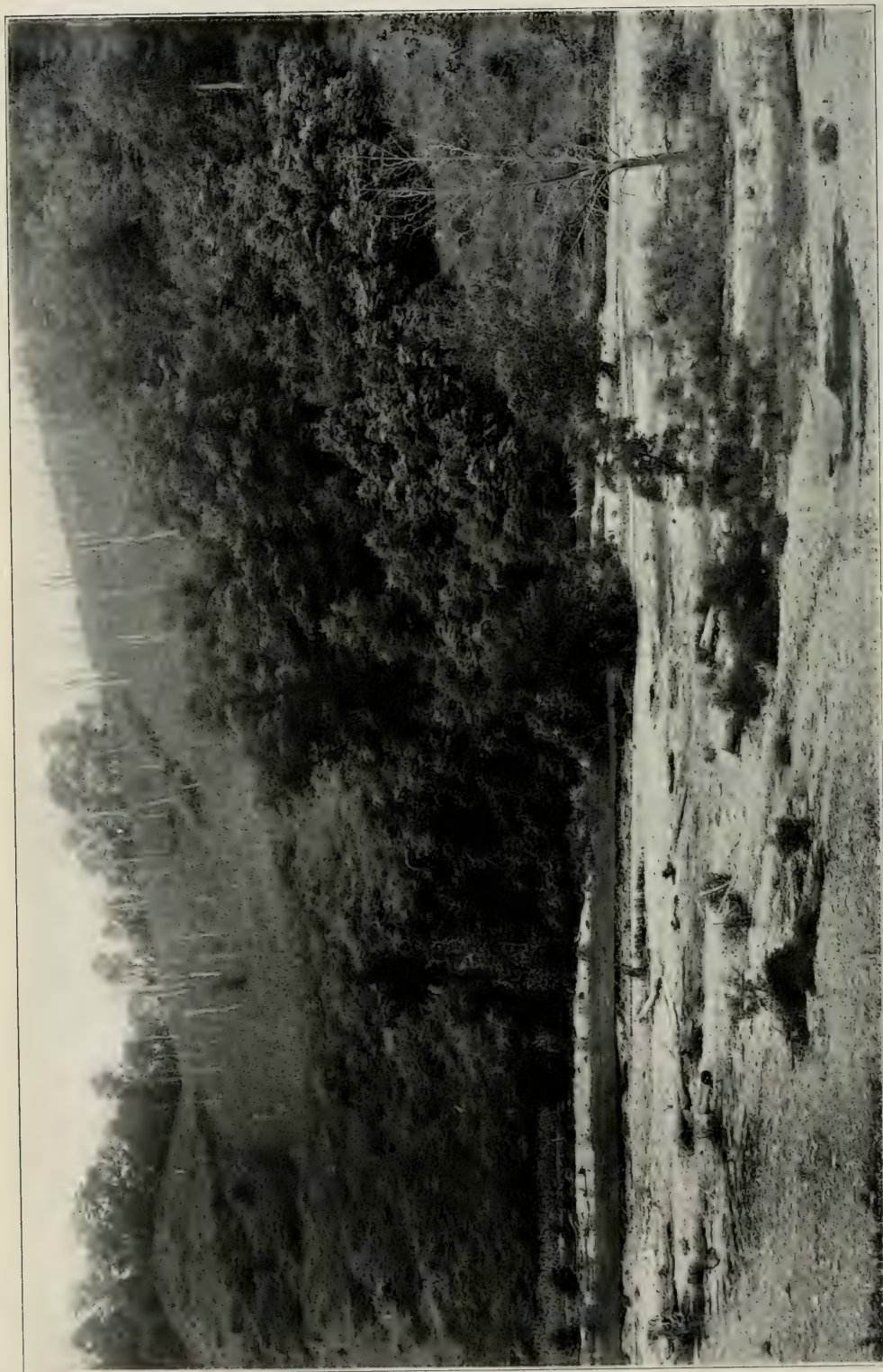
1417 G Street N. W., Washington, D. C.

Dear Sir: I hereby signify my desire to become a member of the American Forestry Association. One dollar (\$1.00) for annual dues is enclosed herewith.

Very truly yours,

Name _____

P. O. Address _____



Valley Land Stripped of Soil by the Freshet of May 21 and August 6, 1901. McDowell County, North Carolina

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No. 3

THE BATTLE FOR THE WEEKS BILL

ANOTHER milestone was passed in the long march toward a truly national forest policy on Wednesday, February 23, when a hearing was given before the House Committee on Agriculture on the bill for the creation of national forests, known as the Weeks Bill, and popularly as the Appalachian Forest Bill. No attempt was made, as in former years, to secure a large attendance at this hearing, or to make a popular demonstration. For three years this had been done, and the convictions of the people and the organizations of the country are well established, and equally well known. This hearing was devoted principally to the examination of three expert witnesses, and it is no reflection upon earlier hearings to say that the case has never had a stronger presentation. The sessions opened in the morning and were continued in the afternoon, and there was a good attendance of the committee at both sessions. Since the opinion of the Judiciary Committee of the House of Representatives two years ago has made it necessary to consider this question with reference to its bearing upon the navigability of streams, the testimony was concentrated mainly upon that point, and peculiar interest was given to the discussion coming from distinguished scientists who have thoroughly studied the question with which they were dealing, in view of the fact that these men unanimously controverted the conclusions of the re-

port recently made and widely circulated by Willis L. Moore, chief of the Weather Bureau. The three experts who appeared were George F. Swain, professor of civil engineering, Harvard University; L. C. Glenn, professor of geology, Vanderbilt University, and Prof. Filibert Roth, the head of the Forest School of the University of Michigan. Thus, with an engineer, a geologist, and a forester, all of whom stand in the first rank of their professions, the case had a broad and able consideration. Mr. Moore's contention that "forests should be preserved for themselves alone, or not at all," and again that "the run-off of our rivers is not materially affected by any other factor than the precipitation," was declared by the three gentlemen named to be not substantiated, and some of his conclusions were said to be ridiculous.

Charles F. Scott, of Kansas, chairman of the committee, presided, and the case was opened for those who appeared in behalf of the bill by Frank D. Currier, representative from New Hampshire. Mr. Currier introduced Andrew J. Peters, representative from the eleventh Massachusetts district, one of the Boston districts. Mr. Peters voiced the intense public interest of New England in this matter, naming a long list of business and other organizations which have endorsed and are urging the passage of the bill. He declared that New England has paid her



Hon. John W. Weeks, Representative from the Twelfth Massachusetts District

share cheerfully for the forest reserves of the West, affecting watersheds which produce only three per cent of the developed water-power of the United States, while those of New England affect thirty-seven per cent. He urged the commercial importance of the White Mountain forests, and closed with an urgent appeal in behalf of the people of New England for this generally demanded legislation.

Mr. Currier said that New England was deeply interested in all conservation matters, and her people were willing to pay their share, but feel that they are not being treated fairly when

their needs are overlooked and all of the money is spent in the West.

The first of the experts to speak was Professor Swain, who represented the Boston Chamber of Commerce, the Massachusetts Forestry Association, the Society for the Protection of New Hampshire Forests, the Appalachian Mountain Club, and other organizations. Professor Swain is one of the best-known engineers in the country, of recognized authority and wide experience. He has given much study for years to the effect of forests upon stream-flow, the question to which he turned his special attention. Referring



After Logging. White Mountains, New Hampshire

to the much-discussed papers of Professor Chittenden and Mr. Moore, he said that they did not affect this case. We do not favor forests on lands better suited for cultivation, but on land that is not suited for cultivation. The first part of Mr. Moore's report dealing with the effect of forests upon rainfall is comparatively unimportant because little stress is laid upon this aspect of the question by advocates of forest maintenance. Discussing the effect of forests upon floods and erosion, Professor Swain cited eminent German authorities. He made it plain that this is a matter that is dependent upon variable conditions. Floods are due to rainfall

and snowfall which are not determinable even by long series of observations. We are thus thrown back upon common observation and fundamental principles. The regulative effect of the forest reservoir is upon average flood conditions rather than on extremes. That a great flood may sometimes occur in a forested country is no more a reason for disregarding forest protection than is the occasional occurrence of a great conflagration in our cities a reason for discarding the usual means of protection against fire.

The speaker cited the French authorities Belgrand and Vallés in support of forestation for the prevention of ero-



Hon. Frank D. Currier, Representative from the Second New Hampshire District

sion. In making this citation, he showed that these authorities had been misused by Mr. Moore, who cited them in his report. He also compared Mr. Moore's citation of Lauda with the actual statement of the latter in his paper at the Milan conference on inland navigation. He introduced in evidence the opinion of the eminent French scientist, Professor Vélain, of the Sorbonne, to the effect that the Seine flood was in part due to the denudation of the watersheds of the Seine and its tributaries. In regard to Mr. Moore's seventh conclusion, that the run-off of rivers is not materially affected by any other factor than precipitation, Pro-

fessor Swain said that this is evidently ridiculous, since every one knows that the slope of ground, character of soil and of rock, and the elevation affect the flow from the surface. With reference to Mr. Moore's conclusion that floods or droughts are not affected by the forests, he called attention to the fact that, inasmuch as forest cover retards the flow of water from the surface of the ground in summer time and also retards the melting of snows in the winter time, it must be clear that in general the forests regulate, and maintain the even flow of streams, although they may not affect the greatest floods and droughts, which occur only at consid-



After a Fire in the Slash. White Mountains, New Hampshire .

erable intervals. He called attention to the fact that Mr. Moore arrives at no conclusion with reference to erosion, which is one of the most important elements affecting the navigability of streams. He also pointed out clearly that the extreme high and low-water stages were important in this connection.

In conclusion, he urged that while it is argued that no serious results have as yet followed deforestation in this country, the people believe in prevention, and they hold the idea—and in the main it is correct—that forests do affect the storage and run-off of the

streams. Furthermore, while this measure calling for national acquisition of forest land must rest, so far as present decisions are concerned, upon the effect of the forests upon navigation, there are other important considerations such as the water-powers, the commercial value of the forests themselves, their influence upon health, and their beauty, which, while they are aside from the legal powers of Congress, add to the value of such action as is proposed, and should increase the willingness of Congress to take such action when it is clearly shown that these forests upon the steep slopes have an ef-



An Erosion Gully After Logging, White Mountains, New Hampshire

fect upon navigation which gives constitutional warrant for the enactment of this measure.

Some questioning followed on the part of members of the committee, and Mr. Currier brought out the fact that a bar has been forming for several years near the mouth of the Connecticut in Long Island Sound which has been found to be composed largely of granitic sand, which could only have come from the White Mountain country.

Professor Glenn, of Vanderbilt University, who has appeared in these hearings in previous years, is always an in-

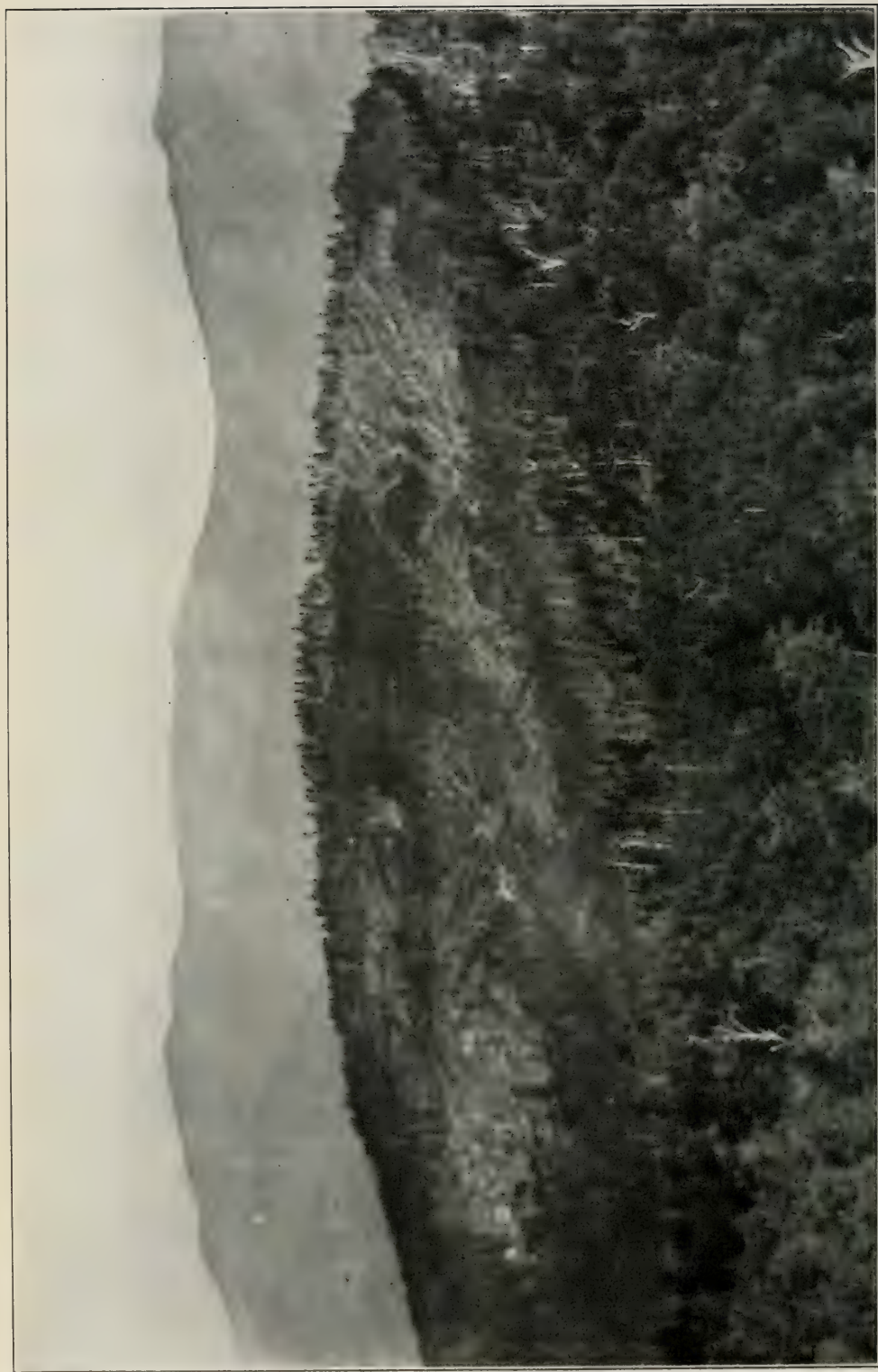
teresting witness because of his accurate scientific knowledge and because of his intimate personal acquaintance with conditions in the Southern Appalachians. For four years as a geologist in the employ of the North Carolina Geological Survey, the United States Forest Service, and the United States Geological Survey, he traveled on horseback and on foot through the whole Southern Appalachian country, living with the people and becoming acquainted at first hand with all the conditions. He showed that deforestation, Mr. Moore to the contrary notwithstanding, does increase both the fre-

quency and the height of floods by eroding the steep slopes and thereby conveying the water more rapidly to the streams and at the same time filling them with sand and making them less capable to carry it away. He showed that deforestation decreases the low-water flow, making it lower than under forested conditions, and gave numerous concrete examples of this effect. He further showed that the eroded waste filled the stream channels and worked its way down stream, filling the reservoirs of power plants and destroying their value, and ultimately filled the navigable streams, ruining much of the improvement work of the army engineers. Dredging, for instance, has to be repeated time and again, while gravel deposits are steadily filling the rivers and harbors. The better policy would be to prevent waste from entering the streams by keeping the steep mountain slopes forested. Professor Glenn showed how streams so protected scour themselves and are rarely subject to filling, while streams whose watersheds are denuded gradually have their channels silted up and are able to carry less water, and are therefore much more subject to floods and low water. He also showed that much valuable land has been ruined in the South by floods carrying gravel and sand over the rich bottom-lands and reducing to waste thousands of acres that were formerly among the most valuable agricultural lands of the southern country. Conditions are rapidly becoming worse and the people support eagerly the proposed legislation, and are demanding it as the most vital thing for them now before Congress. Professor Glenn, personally, does not think highly of the proposition to regulate Southern Appalachian streams by storage reservoirs, regarding reforestaton as preferable in many ways.

Chairman Scott had interpolated several questions during Professor Glenn's statement, these questions relating especially to the farm lands on the lower slopes of the mountains, which Mr. Scott holds are the chief sources of ero-

sion. Professor Glenn said that many of these farm lands should never have been so used, not being suited for cultivation. He had found fields cleared and cultivated on slopes of thirty-seven degrees, measured by clinometer. Such slopes are altogether too steep for cultivation. The problem in the Southern Appalachians is both an agricultural and a forestry problem, which can only be solved by reforesting the steep slopes and saving the gentler ones by terracing, ditching, and better cultivation. But the proportion of suitable agricultural land is not over twenty per cent of the area of the mountain country, as against at least eighty per cent which is profitably available for forest growth only. The statement of Mr. Moore that more of these slopes should be cleared would be followed by disaster if carried out under present methods of cultivation. He showed that while the source of flood damage is on the upper slopes, the actual damage is done when the water strikes the gentler slopes where the run-off is not so rapid. The headwaters, so far as flood water and erosion are concerned, are the locus of the chief destruction. Deforestation does increase the height and frequency of floods; there can be no doubt about this.

Professor Glenn was the last speaker at the morning session, and the committee reconvened at three o'clock in the afternoon, when Professor Roth, of the University of Michigan, was the first witness. Professor Roth stands in the first rank of American foresters in point of wide experience and professional knowledge. He showed several photographs, reproductions of which appear in connection with this report, illustrating the effect of deforestation in the Southern Appalachian and White Mountains. Mr. Scott took exception to one of these photographs on the ground that it showed conditions in the low rolling country rather than in the mountains. Professor Roth argued that photographs were not reliable so far as slope was concerned, and that the conditions illustrated there



Logging Operations on the North Spur of Chocoma Mountain. White Mountains, New Hampshire



Abandoned Pasture on Tributaries of Cane Creek. Several Small and Several Very Deep Gullies Are on This Land
Mitchell County, North Carolina

were such as would exist on the steep slope. Representative Weeks of Massachusetts, who had taken charge of the hearing during the morning when Mr. Currier had to attend a hearing of his own committee, suggested that so far as the nature of the land was concerned, its selection depended upon the judgment of the Geological Survey. A general discussion arose at this point, participated in by Messrs. Scott, Lamb, Currier, Plumley, and Roth, in regard to erosion, slopes, and farming. When Professor Roth was again allowed to proceed he urged that it is worth something to know that the people of Europe, who have fought this question all over, believe in the influence of the forests upon stream-flow, and without exception have laws regarding the maintenance of protective forests. He also called attention to the fact that Congress, in 1897, was largely influ-

enced by the fact that the western forests were generally believed to have a beneficial influence upon the flow of water of the western states, making them important in the irrigation work. He then pointed out the fact that upon the main issues there was general agreement among scientists, engineers, and others, as well as among the people of our country; that it was generally believed that forests were especially important in holding the soil on the slopes of the mountains, keeping it in a retentive condition and retarding the rainfall by preventing gullying, the gullies being in the nature of under-drains or ditches in which the water rapidly collects and rushes away. He called attention to the fact that the forests at the present time appeared to be the only feasible and economic means of regulating the flow of our navigable rivers; for artificial reservoirs, the only



Eroded Slopes, Western North Carolina

alternative thus far suggested, would destroy railways, highways, and other existing improvements; would prevent the use of valleys, converting them into lakes and reservoirs, and in many cases such artificial regulation of the streams would endanger life and property, besides requiring enormous sums both to construct and maintain; and that in all probability such artificial means would come to nothing if the forests were allowed to be devastated and the mountains converted into waste land such as are already seen in parts of the Appalachians, both North and South. The most important opinion advanced by Professor Roth was that the forests are the only means of holding soil and regulating stream-flow which can at once be established and are already established through probably more than eighty per cent of all these lands, only requiring attention by proper protection and use. In contradiction of the

claim that all these forest improvements and protection would require unusual expenditures running into the hundreds of millions of dollars, Professor Roth clearly showed that these lands, when purchased, could be generally protected and forests maintained upon them for all time, and at the same time the forests would become in a few years not only self-supporting, but paying for themselves, so that the expenditure upon the part of the people would become actually an investment. Professor Roth emphasized the fact that he was willing to stake his reputation and stand by the committee if they voted favorably upon this bill, and he believed that the people at large would do the same thing.

Mr. G. Grosvenor Dawe spoke for the Southern Commercial Congress, of which he is the managing director. He said that the business element of the South expects action; that seven of



Deep Gullies Washed in An Old Field, Long Cultivated in Corn, and Abandoned When Soil Became Thin. Scattered Reproduction of Hardwoods and Pitch Pine, but Not Sufficient for Protection. Jackson County, North Carolina

the states in which government action is expected have passed the necessary enabling acts, the matter being of such importance as to overcome their state's-rights scruples. This action on the part of a number of southern states is sufficient notification to their representatives in Congress to support this measure, and that they expect constructive action following their own. There is a new progressive business spirit in the South, he said, which is not bound by party lines and which looks not alone to the present revenues, but rather to the welfare of the South for the later generations as well as the present one. No statesmanship which does not include this view is constructive, and the South stands for constructive statesmanship. He particularly deplored destruction of the forests by non-resident owners who acquired the lands in the

mountains for cheap prices and are now robbing the South of its natural resources. He urged the committee to consider the question broadly and to make a favorable report.

In closing the presentation of the case, Mr. Weeks made a plain and forcible statement. He explained certain details of the bill in which it differs from that of last year. These are chiefly in the removal of all references to the existing national forests and the income from them, making the appropriation direct from the Treasury, and in the reduction of the life of the bill from nine years to five years. Mr. Weeks urged that Congress should certainly have confidence in the Geological Survey upon the scientific judgment of which decision as to the purchase of these lands would ultimately rest, and that, if the Survey could not be trusted,

it should be reorganized. He believed that this was a sufficient check upon the expenditure for the purpose of the bill. He offered a homely illustration from his experience as a boy on the farm in northern New Hampshire as a further contribution to the discussion of Mr. Moore's report. He said that on the hillside pasture the snow would be gone in the spring so that one could walk in thin shoes, when the snow was lying a foot and a half deep in the woods just above the pasture. It is a matter of common observation which needs no scientific knowledge, he pointed out, that if the trees were cut off from this land it would be in the same condition as the pasture adjoining.

Finally, Mr. Weeks urged upon the committee that it is not new legislation, and that it would be gross injustice not to report back to the House a bill which has in substance passed the Senate twice and the House once. To prevent action on this bill would be resented by Massachusetts and by all New England. The bill is moderate in character and, in my mind, he said, will start a policy that will be of great benefit to the whole country. He urged prompt action, and said that hundreds of thousands of people all over the country were behind this measure, that it had been advocated by President Roosevelt, by President Taft, and is the one practical measure that has been offered in the direction of carrying out the conservation policy.

Mr. Currier made no formal speech, but supported his colleague effectively with pertinent suggestions and facts.

This report necessarily gives a very inadequate impression of the able presentation of the case to the committee.

The interchange of question and answer, the keen and unassailable scientific arguments advanced by Professors Swain, Glenn, and Roth made the hearing a notable one in the history of the campaign in behalf of the Appalachian forests. Chairman Scott, at the outset of the hearing, requested the members of the committee to refrain from interrupting the speakers with questions until they had concluded their statements. Within a few minutes after this he himself interrupted the first speaker and he continued this practice of interruption with questions and interpolation of his own views, especially in the afternoon, when Professor Roth was speaking. This interfered with the orderly presentation of the argument which Professor Roth had prepared, but perhaps it did not interfere with the effectiveness of the discussion, as Mr. Scott's questions were adequately answered. Mr. Scott's well-known opposition to this measure has not in the least abated and is plainly shown in his conduct of the hearings. Indeed, he appears at times more anxious to bring out his own theories, some of which are well defined, than to hear the uninterrupted statement of the expert witness.

The general interest of the committee was shown by the good attendance and keen attention to all points brought out in the discussion.

Mr. Moore's position previously taken before the same committee was so badly riddled by the discussion that the committee considered it necessary to give him an opportunity to take the stand in his own defense, and a special hearing was assigned for that purpose for the 1st day of March.



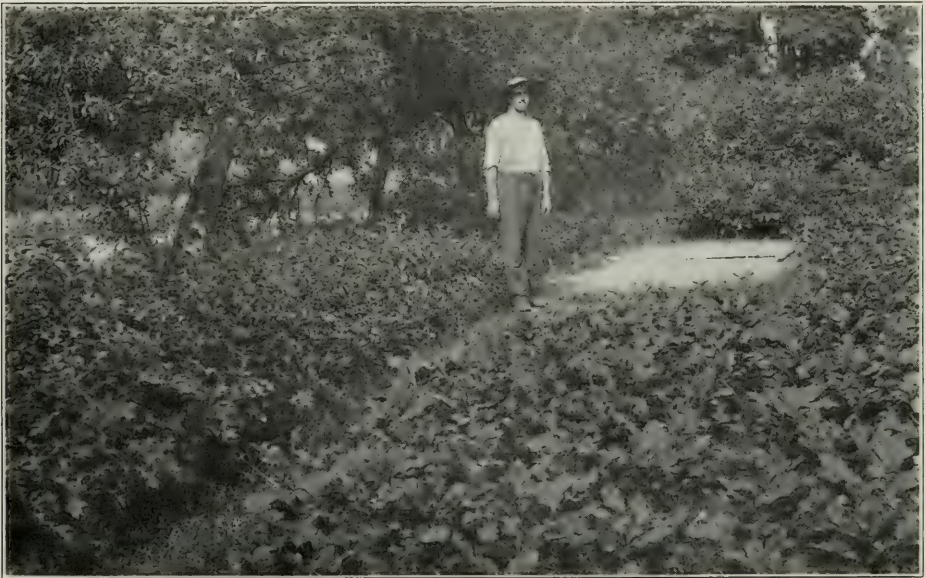
GROWING OAK TREES

By EDWARD W. HOCKER

IT IS no easy task to enlist the support of farmers and other land-owners in an undertaking the profits of which cannot be realized until after the lapse of a century or more. But some such undertaking is necessary if the oak and other American hardwood

wider variety of purposes than any of the others, usually is not available as timber for a period varying from 120 to 200 years after the acorn has germinated.

Poets sing about the stanch old oak; and there is something venerable, some-



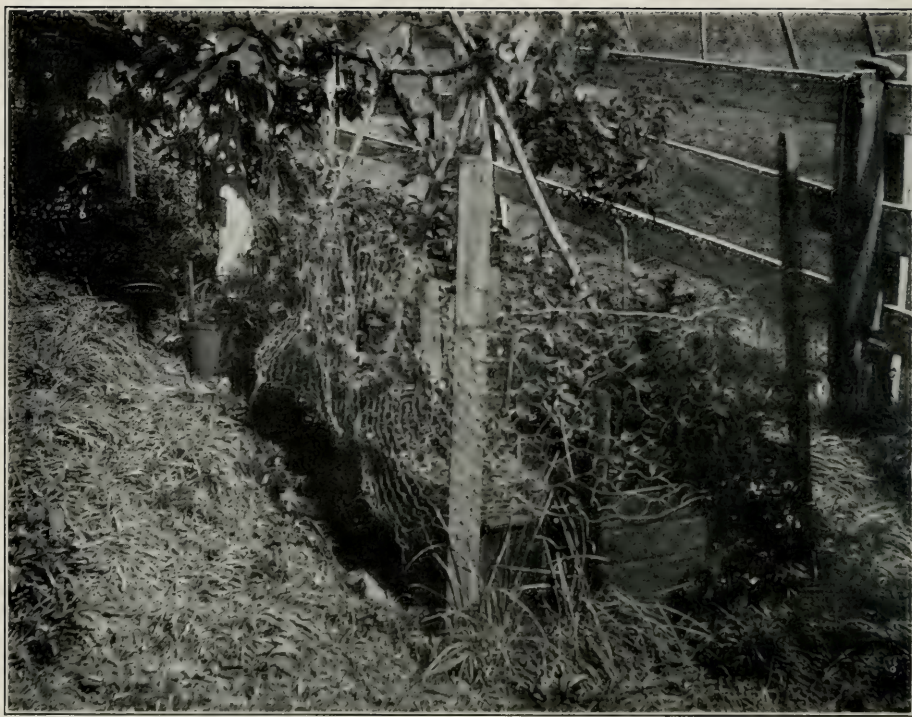
Charles S. Mann and His Beds of Oak Seedlings

trees are not to become so rare as to forbid their use for the practical purposes they now serve.

Everywhere throughout the land the increasing scarcity of the various kinds of hardwood is lamented. Prices are rising at an alarming rate, and it is evident that the quantity consumed yearly is three or four times as great as that which becomes available from growing trees. Now, the hardwoods nearly all come from slowly growing trees; and the oak, which serves a

thing well-nigh sublime, about an ancient tree of this variety. Poetry and veneration, however, will not prevent the oak from becoming extinct. A campaign of education must be commenced in behalf of the systematic growing of oak trees.

Under the auspices of the national government and of some of the states, attempts have been made to foster the growing of slowly maturing trees in the forest reserves; but thus far few individuals have been willing to de-



How Some of the Rarer Kinds of Oak Seedlings Are Grown on the Mann Farm

vote much serious attention to the planting of trees solely for posterity. Therefore, an instance of that kind in Pennsylvania, where a farmer of moderate means is exerting himself by example and by advice to further the planting of oak trees, merits attention because it is an altogether altruistic endeavor.

Somewhat more than fifty species of the oak grow in the United States, and about twenty-five are found throughout the northeastern portion of the country. On his Arbormead Farm, in Horsham township, Pennsylvania, fifteen miles north of Philadelphia, Charles S. Mann is growing not less than thirty species of the tree, some being represented by hundreds of small trees, while of others there are only a few experimental specimens. Moreover, it must be borne in mind that Mr. Mann is not a nurseryman, and is not growing trees for profit. He is what is usually termed a "small farmer," just like the

average tiller of the soil throughout the country. His undertaking in oak-growing is the outcome of his intense love of the study of forestry, his realization of the great havoc wrought in the forests of America, and his zeal to encourage his fellow-farmers to grow oak trees.

Ten years ago he began planting oak trees. Thus to-day none of his trees is of great size, save a few that stood on the farm long before he took up his special work. A space of several acres about his house is his field of operation. The common varieties that are to be found in Pennsylvania are growing in large beds, and the trees vary in size from a few inches to six or seven feet. These include the pin oak, which grows faster than any other oak and sometimes matures in seventy-five years; the white oak, the black oak, the red oak, the scarlet oak, which is particularly beautiful in autumn; the mossycup or burr oak, which has the



The Tree-embowered Mann Homestead

largest leaves and acorns; the live oak, the willow oak, the post oak, and some others.

Rarer varieties whose adaptability to the climate is still a matter of doubt, are planted in boxes or in discarded tinware. They are screened with wire to protect them from marauding animals, and during inclement weather can be removed to shelter. Among the varieties thus grown are the blackjack oak, the rock chestnut oak, the southern water oak, the Bartram oak, the southern laurel oak, the Texas red oak, the holly oak, the Sterling or cleft-leaf rock oak, the cinnamon oak, the bluejack oak from Texas, the California black oak, the mountain oak, the Hooker oak, a weeping white oak from California where the tree has a spread of 150 feet and is more than 100 feet high; the Texas live oak, the chinquapin oak, a western dwarf that grows like a bush; the shingle or northern laurel oak; the overcup oak, the Spanish oak, and the turkey oak. Besides these American

oaks, the English and the golden oak are also represented.

Nearly all these trees were grown from seeds which Mr. Mann either gathered in the woods or procured by writing to persons at a distance who are interested in forestry. Through correspondence he has obtained seeds from twenty-seven states.

A striking evidence of Mr. Mann's enthusiasm is the fact that he is replacing his apple orchard with an oak grove. San Jose scale has wrought havoc among the apple trees during the past few years, and they are of little value. So Mr. Mann is transplanting oak trees from his beds to the orchard.

Mr. Mann is striving to arouse the cooperation of school children in his tree-growing project. He is a member of the township school board, and he has planted oak trees on the grounds of several schoolhouses and has also placed attractively arranged collections of the leaves of the various species of oak trees in schoolhouses. Explain-

ing his endeavor, Mr. Mann says: "An inborn love for plant life, especially in its highest forms, shrubbery and trees, induced me to attempt to make a collection of native timber and ornamental trees. Like many another 'small farmer,' I could not afford to buy them at fancy prices, so I thought out a plan of procuring the seeds and planting them. Such seeds as I had I could change with other tree fanciers for some sort that I wanted from other parts of the country, and so not merely supply my own wants but grow enough to spare to any one who should care to adorn school grounds, roadsides, and home grounds.

"I hoped and believed that the surest way to draw the attention of the people to this most useful branch of nature study would be by planting trees that would show by comparison and contrast the marvelously rich and varied assortment of our beautiful indigenous trees which have never yet been fully appreciated, but have always been wasted and destroyed. I wanted to make some attempt, however small, to save some of the great quantities of forest-tree seeds that annually go to waste unnoticed throughout the land, which, for climatic as well as for economic reasons should be saved and planted to provide the millions of seedling trees needed to reforest the lean, bare, rocky and untillable hillsides and mountains of Pennsylvania and other states. For the great work of the national and the state forest service must be sup-

plemented by the individual efforts of every public-spirited landholder.

"I would especially like to get the teachers and pupils of the public schools interested in this cause—to help them all to admire, study, protect, love and to some extent propagate our most useful and beautiful trees in connection with the school-garden movement, beginning by collecting and planting such seeds as they could find at home and on the way to school.

"The underlying motive of my work has not been for pecuniary gain, but nevertheless I believe it will always pay well to produce trees whose age and antecedents are known.

"In many parts of the central West the noble hardwoods are in danger of extermination. Of some of the more rare and valuable sorts, like the shingle, the overcup, the Spanish and the chinquapin oak, the elms, hickories, and pecans, there are not enough left to perpetuate the species. And it is high time to take heed lest the more common varieties suffer a like fate."

Though Mr. Mann centers his efforts upon the raising of oaks, he is likewise growing specimens of almost all native trees of North America. Indeed, his love for trees is so predominant that the ancient farmhouse wherein he lives is almost concealed from view on all sides by trees. This house was built in 1754 by John Mann, one of the Scotch-Irish settlers of Pennsylvania, and the property has been in the possession of the Mann family uninterruptedly for 160 years.



FOREST PROBLEMS IN THE PHILIPPINES

By BARRINGTON MOORE, M.F., United States Forest Service

[Continued from the February number]

IV—HOW PROBLEMS ARE BEING SOLVED

IT IS with great pleasure that we turn from the consideration of the problems to a brief sketch of the fine work which is being done to solve them.

All the strictly botanical work has been very wisely turned over to the Bureau of Science, which describes and classifies the specimens sent in to them by the Bureau of Forestry. The Bureau of Forestry collects enormous quantities of specimens, generally a large section of the tree and leaves, together with the fruit wherever possible. On each specimen is placed a serial number. This number is always mentioned in any future reference to the specimen and serves as a sure means of identification. The Bureau of Science keeps a careful record of all the information on a card catalogue system and sends back to the Bureau of Forestry such data as is necessary. In the Bureau of Forestry hand specimens of all the species identified are kept on shelves, arranged alphabetically by families, genera, and species, so that it is possible to pick out any desired species instantly. This botanical work of the Bureau of Science, requiring, as it does, a systematic botanist of the highest skill, has been done so well that it is acknowledged to be better than any botanical work heretofore done on tropical trees in the world.

In addition to this strictly botanical work of the Bureau of Science, an ecological study of the whole forests of the Philippines is being made by the chief of the Bureau of Investigation, who probably knows as much about the ecology of tropical trees as any man

living. This invaluable work, when complete, will be unique of its kind.

The properties and uses of the woods identified is so carefully and thoroughly done, that even those species of rare occurrence are worked up, because they may be found to be of value for some special purpose, such as tool handles, etc., so that it will pay to go long distances in the forests for a single tree.

As regards silviculture, practically nothing has been done so far, on account of the smallness of the force and the pressure of other work, demanding more immediate attention. However, a beginning is being made by the drawing up of a plan for a system of sample plots. This work is to be done by a man of wide experience with sample plots in the United States, and will doubtless lay the foundation of a thorough silvicultural study of all the trees of the islands.

As regards the problem of population, the need for fuel and building material has been met by the setting aside of any small bodies of forest which a community may apply for, to be devoted solely to supplying the needs of that community. This is an adaptation of the system used with more or less success in parts of India.

As far as Caingins are concerned, it is unfortunate that very little can be done at present. Although the bureau is making strenuous efforts to stop them, the smallness of the force at its disposal, the large areas of unmarked forests which it has to look after, and, above all, the lack of support from headquarters, make the task an impossible one. As soon, however,

as the forest reserves are established and a force organized, the forests will be protected against Caingins as against other destructive agencies.

Cogan or grass lands cannot be utilized until the government clears up the invalid Cacique claims to it. This could be done by a properly-collected land tax, which would immediately cause them to drop their claims, because the land is of no use to them and they are all land-poor; or, preferably, by laying off the whole of the islands into townships, sections, quarter-sections, and forties, as with the public domain in the United States, and making everybody prove up his claim.

The attempts at making a survey of the islands have so far been worse than futile. They have consisted in maps of occasional isolated small fields made by the Bureau of Lands, for the purpose of marking the boundaries, each map being made separate, so that it will be impossible to tie them together. This is costing considerable sums of money, which is all wasted, because the work will eventually have to be done all over again. The only solution of this problem—a solution suggested by men who have been in the islands for some time and have given the matter considerable thought—is for the government to “grasp the bull by the horns” and have the United States Geological Survey send a party over to do it properly, once for all. This was advocated by President Roosevelt in a special message to Congress, but the commission refused to have it done, perhaps because they thought they could do it without outside help.

For the regulation of the taking up of homesteads, a sound scheme, suggested by a member of the Bureau of Forestry, is that certain bodies of land suitable for cultivation should be selected by the Bureau of Forestry and notifications sent around to the people of the neighborhood, so as to give anybody desiring a homestead a chance to send in an application. Then all these applicants could be moved bodily onto the land. The advantages of this scheme to the people themselves would be two-

fold: First they would be kept together in a community, which is the way they like to live; secondly, the haphazard, hit-or-miss element of the ignorant individual picking out a piece of land would be obviated. Of course, this would also enable the Cogan lands to be settled up where cultivating them did not involve too much hardship.

In utilizing the forests the most astounding progress has been made from a lumbering point of view. From the silvicultural point of view, it is unfortunate that conditions have forced the bureau to open up the forests so rapidly before more was known about how to cut them. But, considered broadly, the opening up of the forests, though perhaps not such a rapid opening, is the essential preliminary to their future management, without which nothing can be done, so that the amount of loss suffered in the beginning will be more than repaid in the end.

For the control of logging operations, certain logging rules have been laid down by the bureau in each case, so as to do as little injury to the forest as possible. For example, the rules for the Cadwallader concession in Bataan Province, on Manila Bay, are in substance as follows:

General, for agricultural and non-agricultural land.

1. Forest on land below 500 feet elevation can be cut clean, because this land is considered agricultural.

2. Timber cut, used, or wasted in violation of the cutting rules, or forest regulations, is to be paid for.

3. Tops, etc., are to be used for firewood wherever practical.

4. Felling is to be done with saws as far as possible.

5. No trees are to be left lodged.

6. No stumps are to be higher than the principal buttress, or, without buttresses, than the diameter of the tree on the stump.

7. Defective logs with fifty per cent or more of clear, sound timber shall be utilized.

8. Minor products shall be gathered if possible.

Cutting rules for non-agricultural land:

1. Diameter limit of forty centimeters (fourteen inches) breast height for Lavan, Apitong, Panao, Giujo, Tanguile, or trees of the first group.

2. All sound trees of other species may be cut, and those of more than seventy-five centimeters must be cut and utilized.

3. None of the above-mentioned species or first group woods shall be used for logging construction, except with the special permission of the forest officer in each case.

4. Workmen must not destroy seedlings of the above-mentioned species or first group.

The chief objections to these rules are that, firstly, it is unwise to clear-cut a part of the forest for agricultural land when it is not needed for settlement and may not be needed for a good many years. Secondly, the diameter limit of fourteen inches is far too low. A limit of twenty-four inches would not cause much loss to the lumberman and would save some fine young poles.

The concessions taken up are being worked with characteristic American enterprise. On two concessions logging railroads have been run up into the forests and regular stream logging, hauling the logs to the railroad by donkey engines, is being carried on. On one concession, that of the Insular Lumber Company, the operations are an exact copy of the lumbering operations of a large company in Seattle, Wash., and the sawmill, of 100,000 board-feet daily capacity, is as thoroughly fitted up with up-to-date appliances and as well run as almost any mill in America. It must be remembered that all this is a new venture, believed to be utterly impossible a few years ago. It has rendered not only possible, but profitable, the utilization of the large quantities of *Diptocarps*, until recently considered practically useless.

We now come to the keynote of the whole policy of the bureau—the establishment of forest reserves. Until recently the necessity for doing this was

not fully realized. Hence, with the exception of one small reserve at Limao, across the bay from Manila, none has so far been established.

Since the policy was started preliminary work has occupied the entire attention of the bureau. It was first necessary, of course, to locate the forests before asking to have them reserved. This work consists of making a thorough reconnaissance survey of the whole islands, a very difficult undertaking. The only maps they have to begin with are what are called compilation maps. These are the regular coast-guard maps (giving merely the coast line and an occasional prominent peak), on which they have put all the streams and villages which are known. They must have as many names of villages as possible, so as to be able to tell the *cargidores* (Filipino carriers) where they are going. Because the native will not start off so many miles in such and such a direction, but must know that he is going toward some village he has heard of. Often he will not go at all, thus creating a serious difficulty in this kind of work. The coast-guard maps are accurate enough with regard to the coast line itself, but are sometimes away off in giving the width of the islands. For instance, the northern part of the Island of Luzon was found to be six to ten miles wider than the coast-guard map gave it. Hence, they can be used only for putting in the forests along the coast. For the interior of an island they go through lengthwise and crosswise as many times as is necessary to cover it all, keep trail notes by hand compass and pacing every foot of the way. These notes are plotted on cross-section paper in the field on a scale of 1 to 10,000. The sheets are sent in to the bureau and put onto the final map on the scale of 1 to 100,000. The forester who has done most of this work has wisely made the rangers keep the trail notes themselves, believing that it is better to have them learn to do it, even though it may not be done quite so well at first, because, when once they have learned to do it, it is easier to do



A fair-sized Panoa (*Dipterocarpus verniciflus*) on the Cadwallader Concession in Bataan Province, at about 700 feet elevation. This picture also shows the all-aged character of the forest



Felling a small Almon (*Thorea* species); showing the type of platform used to get above the buttresses; also showing the uneven, aged character of the forest. Insular Lumber Company, Northern Negros



Donkey Engine and Yard at the Head of Logging Railroad. Insular Lumber Company Concession. Northern Negros

it right than to do it wrong. He himself examines the forests and collects specimens, sometimes as many as twenty a day. By this policy he is breaking in a force of useful rangers which he turns over to the administrative branch, with the exception of a few whom he retains to help break in the new ones next season. Considering the rough method used, this work is done with astonishing accuracy, more than ample for the purpose. They have already covered most of the important islands in this way. With this data in hand, at any conference or public meeting they can *show facts* and *results*. They can make the people see that they are doing some work and know what they are talking about. Thus half the battle for the reserves is won already.

To summarize the work being done:

1. The work of describing and classifying the flora of the forests excels any work in the systematic botany so far done in the tropics. An ecological study of all the forests of the islands is being made by the chief of the Branch of Investigation.

2. The investigation of the properties and uses of the different woods is being carried on with greater thorough-

ness than has ever before been done with tropical woods.

3. The foundation has been laid for a careful silvicultural study of the trees.

4. Concerning the relations of the forests to the population and the settlement of the land: (a) The question of supplying the needs of the local population for firewood and building material has been solved by the formation of communal forests devoted solely to this purpose; (b) strenuous efforts have been made by the men in the Bureau of Forestry to prevent Caingins, but have been in vain on account of the smallness of the force, the indefiniteness of the areas, and the lack of support from headquarters; (c) nothing can be done with regard to settling up the Cogan lands until the invalid claims of the Caciques have been cleared up by the government; (d) toward obtaining a survey of the islands, nothing has been done, but the worse than useless, dabbling of the Bureau of Lands; (e) a suggested plan for the regulation of homesteads is to have the land picked out by the Bureau of Forestry and a number of people moved on to it bodily as a community.

5. The forests have been opened up by the most up-to-date American method of logging controlled by logging rules.

6. The establishment of forest reserves has been taken as the keynote of the whole policy of the bureau, and the preliminary work is being pushed with the utmost vigor.

7. The money for starting a rangers' school has already been appropriated by the assembly.

V—AN OPENING FOR AMERICANS

All these most interesting problems present a splendid opportunity for Americans of the right sort to do some work which is sure to be of benefit to the islands and so, indirectly, to their own country. Of course, it would be useless to deny that the climate is less favorable for active work than that in the states. This only means, however, that a man must take better care of himself in the Philippines to keep in ordinary good health than he would have to do in the states. If he does take care of himself, there is no reason why he should suffer in the slightest from the difference in climate. Of course, the government will, sooner or later, have to open its eyes to the fact that if it wants a continued supply of good men, it will have to offer higher inducements. At present the salaries are but a small fraction of what they are in India, though the distance to the Philippines is far greater, and the cost of living much higher. The period of service should be greatly increased and a pension provided for a certain number of years' active service in the islands. This would largely increase the force—a thing at present much to be desired—and would give it a more

permanent character. Americans would then be eager to take up a work which for keenness of interest is unsurpassed anywhere in the world.

VI—CONCLUSION

The forest problems in the Philippines are of far more importance than in most countries. On account of the hilly nature of the islands (which are mostly volcanic), the preservation of the forests on the upper slopes is an absolute necessity for the protection of the water supply. And there is also strong evidence to show that forests not only regulate the run-off and retain water in the soil, but actually influence the total quantity of rainfall as well.

In the Philippine Islands, as in no other country in the world, does the solution of the forest problem involve the solution of the land question. Upon the proper handling of this question depends the agricultural development of the country and hence the welfare of a people almost wholly dependent upon agriculture.

The work being done by the Bureau of Forestry is such that no less a person than Doctor Treub, the most eminent botanist in the tropics, in speaking about forestry in tropical countries, said that the Americans had made more real progress in forestry in the ten years in which they have been in the islands than any other nation in all the time in which they have been in the tropics.

It should, therefore, be the proud duty of every American to give his hearty support to work so well done and upon which in such a vital degree depends the whole future development and prosperity of a people whose best interests his country has pledged its honor to care for.





FORESTRY WORKERS OF LOUISIANA

Hon. Henry E. Hardtner, Chairman of the Louisiana Conservation Commission, who was recently elected President of the Louisiana Forestry Association. Mr. Hardtner is a practical lumberman, who believes thoroughly in forest conservation and puts his belief into action

THE EFFECT OF THE FOREST UPON WATERS

Translation by MILDRED A. CASTLE, Wisconsin Department of State Forestry, of an Article, *La Capacité Retentionnelle de la Forêt*, from the *Revue des Eaux et Forêts*, Paris, January 1 and 15, 1909.

This translation of a temperate summing up of the results of European researches upon the subject of the effect of the forest upon waters is of especial value and interest at this time, when a determined effort is being made by men in high government positions in this country to discredit the experience of all nations and the conclusions of the most eminent forestry authorities and engineers upon the subject.—THE EDITOR.

THE aim sought by the numerous associations that are endeavoring to popularize the work of reforestation is not only to ward off a certain deficit in the wood production of our country—a deficit that increases ever with the demands of industry; it is also, and above all, to restore our national commerce and prosperity by rendering stream-flow uniform and by improving navigation in our network of rivers, notably that of our two great rivers in which navigation is becoming more dangerous and difficult every day, the Loire and Garonne.

The remarkable zeal of the promoters of this campaign undertaken to preserve the existing forests and to increase reforestation in the mountainous regions, had its birth in the conviction that the presence of forests causes a more uniform stream flow, lessens the ravages of floods, and sustains springs and streams.

It would seem, indeed, that the action of the forest in regulating stream flow and its favorable influence on floods, as well as on the feeding of springs and rivers, should no longer be in question to-day.

The discussion of this question at the Congress of Navigation at Milan in 1905 showed that there was a divergence of opinion among foresters, hydraulic engineers and geographers. A recent article by the distinguished secretary of the staff of *La Géographie* [Charles Rabot], the review of the

geographical society, presented some points that tended to diminish to a considerable degree the value hitherto attributed to the perennial vegetation of forests in checking floods and regulating stream flow. We beg permission to acquaint the readers of the *Revue des Eaux et Forêts* with the ideas advanced on one side and the other of this subject of vital importance, leaving it to them to draw such conclusions as they think right.

I

THE CONGRESS AT MILAN

Papers by Messrs. Wolfschutz, Lauda, Ponti, and Lokhtine

In discussing, in the article referred to above, the papers given at the congress of Milan by Messrs. Keller, privy counsellor of the administration of buildings at Vienna (Austria), Lauda, counsellor superior to the minister of the interior, and director of the central bureau of hydrography of Vienna; Wolfschutz, agricultural counsellor at Brünn (Moravia), and Ponti, engineer in chief of the Italian corps of civil engineers, Charles Rabot expresses himself thus:

"In France, under the influence of the forestry school, every virtue is attributed to forests and every evil is laid to deforestation. For more than

fifty years it has been admitted as a scientific dogma that forests, by reason of their capacity to retain rainfall, have the power to diminish great floods in the rivers, and that deforestation is the main cause of inundations; it is likewise to deforestation that progressive diminution in water-levels and in low water-flow is attributed, both so noticeable in recent years. In a word, we look upon the forests as regulators of stream-flow, as immense sponges gathering up the precipitation, however abundant it be, and restoring it afterward gradually.

"According to reports presented by the hydraulic engineers at the tenth meeting of the permanent association of the congress of navigation, held at Milan in 1905, we must *discount to a large degree the influence of the forest upon stream-flow and upon springs.*"

So far as the eminent secretary of the Geographical Society is concerned, the statements made by those who presented the reports establish clearly that the influence of the forest on the run-off from rainfall is nothing in times of flood; that it has nothing to do with the existence of springs, but that it is able to hold the soil on slopes, to diminish the volume of matter carried away by streams, to lessen erosion, and to prevent land slips, except in cases of glacial formations. Mr. Charles Rabot adds that at the congress at Milan the partisans of the forest presented no facts and no observations in support of their theory, limiting themselves to affirmations without furnishing proofs.

The conclusions drawn from the papers referred to above by Mr. Rabot seem to us to be much too arbitrary; the reading of the same documents has not left with us the same impression. We would like to present to our readers at the very beginning the most striking parts of the papers presented at the congress; we will discuss them afterwards.

Mr. Wolfschütz has undertaken to show that the retentional power of the forest fails after an extraordinarily abundant rainfall of long duration. He

says in his report: "We must recognize that man is powerless against the principal causes of floods and of abundant rainfall."

According to Mr. Wolfschütz, there fell in the basin of the Rhine 209 millimeters of water in three days, in November, 1882; 215 millimeters in eighteen hours, August 2, 1888, in the Riesenwald; 187 millimeters in twenty-four hours, in July, 1897; 184 millimeters in forty-eight hours in 1897, in the basin of the Traun; 208 millimeters in two days in 1899; 242 millimeters in twenty-four hours at Riechenhall and at Alt-Ausse, September 12, 1899. In 1882, at the time of the Rhine floods, according to Honsell, it was the most heavily wooded watersheds (the Black Forest, the Hardt, the Spessart, the Fichtelgebirge, and the Odenwald) that contributed most to swelling the waters of the Rhine. According to statements of the central bureau of hydrography, Vienna, the most heavily wooded watersheds have often experienced the most disastrous floods, and it was thus in 1897 on the watersheds of the tributaries of the Elbe, in 1897, and in 1899, on the watersheds of the Enns, of the Traun, and of the Ybbs. Even the very dense covering of the Riesenwald had no influence on the floods in the streams of Silesia that occurred, following torrential rains, in August, 1888; July, 1897, and July, 1903.

The powerlessness of man in the case of such an unusually heavy rainfall is apparent to all, but if he is entirely unable to prevent its occurrence, he can, at least, lessen its disastrous effects. Mr. Wolfschütz recognizes, moreover, that the reforestation of some square kilometers "exerts a protective influence on the stream-flow of certain areas adjoining the forests in question or on cleared lands," but that this local and restricted influence cannot extend far.

The report of Mr. Lauda, director of the central bureau of hydrography, Vienna, is one of the most remarkable of those that were presented at the congress of Milan. He takes pains to tell

us in the beginning that "the study of water supply is one of the most difficult problems of hydrography." To solve the problem, Mr. Lauda made minute and very accurate observations in 1903 and 1904, on the amount of rainfall and run-off in the basins of two rivers of Moravia, the Bistritzka and the Seniza. The distance between these two basins is about twenty kilometers. They are similar in the character of the soil, in topography, and in the relative proportion of different kinds of vegetation. Their areas are, respectively, 6,380 and 7,400 square kilometers, but forests cover forty-eight per cent of the territory in the basin of the Bistritzka, while they cover only twenty-seven per cent in that of the Seniza.

The conclusions drawn from these observations are not at all unfavorable to the forest. They are as follows:

The retention of rainfall is in a certain measure greater in the more heavily wooded basin than in the less heavily wooded one.

For abnormally heavy precipitation—as for example, at the time of flood—the retention is less in the more heavily wooded basin than in the one less rich in forested area that is to say that in the latter case, after reaching a certain degree of saturation, the surplus of water that was formerly retained by the forest flows off more perceptibly.

After a dry period the effect of rainfall is manifested more rapidly and more progressively in the less forested areas, while the inverse is true in the basin with the greater forest area.

Mr. Lauda does not deny, then, the retentional capacity of the forest; on the contrary, he distinctly recognizes it, except in the case of extremely abundant rainfall, when the roles seem reversed and the forest soil, saturated with water, no longer retains the rain that falls, but even allows the escape in part of water that it had retained before.

Mr. Lauda stated that on the 10th of September, 1904, after a dry period of more than three months, a very heavy rainfall occurred of about the same depth in the two basins, but the rise of the waters did not become apparent in the basin of the Bistritzka, which is more heavily wooded, until two days after the flood occurred in the

basin of the Seniza, which is less heavily forested. Similar observations were made in 1904.

The retentional capacity of the forest after a dry period is then well established, and if it is not effective under all circumstances, it proves that the influence of the forest has a limit, which is not to be wondered at.

We might examine the figures given by Mr. Lauda; but even with the probability that the volume of water constituting the run-off from each river could have been calculated exactly, although errors might easily be made in the case of high floods, it is difficult to admit that the amount of rainfall could have been gauged with sufficient accuracy. A number of rain gauges scattered over an area of 6,000 to 7,400 square kilometers is not sufficient to establish mathematically the exact depth of rainfall. Moreover, is Mr. Lauda right in saying: "Final judgment cannot be passed yet, however, upon the influence of forests on stream-flow, as the data that has been gathered up to the present covers only a relatively short period of time?" We must wait, then, before declaring the theories accepted up to now in regard to the influence of forests on floods, barred by limitation and before treating the action of the forest as merely claimed, not established.

If Messrs. Wolfschütz and Lauda have appeared to some to oppose in their papers the ideas accepted up to now in regard to the action of forests in lessening floods and feeding springs, it is by no means the same with Messrs. Ponti and Lokhtine, whose papers are veritable pleas in favor of the forest. In reading them, one is convinced that at the congress at Milan the "partisans of the forest" have indeed furnished some facts and interesting observations to support their claims.

Mr. Ponti gave in his paper a striking picture of the condition to which Sardinia was reduced after the clearings made on the island in 1870, which lowered the percentage of forested area from forty-three per cent to twenty-six

per cent; floods in the rivers became more rapid, channels were filled with debris, and bridges were carried away. In Sicily, deforestation has likewise had the effect of raising the level of the river beds; in the province of Campobasso (Molise) cuttings made over one-third of the land surface deepened the beds of the streams greatly, and caused the breaking down of the river banks to such an extent that one-tenth of the ground was carried away. Reforestation has produced opposite effects in the province of Grosseto (Tuscany), Avellino (Campania), and Sondrio (Lombardy). In Sondrio reforestation diminished the floods. Mr. Ponti also cites the floods of the Adda in 1806 and 1817, and of the Malero, 1834, which followed very closely upon deforestation.

We will discuss at greater length Mr. Lokhtine's paper, which treats above all of the action of forest vegetation on the flow of springs and streams. This savant cites numerous examples of streams that have dried up and disappeared following deforestation. It is in this way, he says, that the springs around Rome, Vienna, and Constantinople disappeared after cuttings had been made on the hills that surround these cities.

A Roman aqueduct brought to Orleans water from hot springs. There is not a trace left of these springs to-day. Becquerel reported the case of a stream of Caunau, in the commune of Labruguière (Tarn), which in former times furnished power for several fulling mills; after the deforestation of the slopes of the Black Mountain, this stream was subject to sudden floods and its flow diminished to such a degree that work could no longer be carried on. After the denuded areas had been reforested, the flow increased and became more regular; the mills were reopened and could be operated uninterruptedly.

The hills that surround Heilbronn (Württemberg) are covered with a forest growth, which is subject to regular cuttings made every twenty years. It

has been declared that the flow from the springs diminished when the soil was denuded following a cutting, and that it increased when the forest growth had gained possession of the ground again.

Marchal cites similar cases in Switzerland. The Swiss engineer, R. Lauterburg, states that, for an equal area, springs issuing from forested watersheds have a flow five to ten times greater than those from denuded watersheds. According to the same author, the destruction of the forests that took place in the canton of Tessin during the first half of the nineteenth century reduced by more than one-quarter the flow of the Adige during low-water periods.

Messrs. Shriner and Copeland, who mapped four townships around Monroe (state of Wisconsin, United States) in 1904, observed that the percentage of forested area in this region had been reduced in a period of seventy years from eighty-three to six per cent. The water level of the rivers had lowered steadily; the consequences of deforestation had become more apparent than ever since 1887. More than forty kilometers of streams are dry during the entire year; numerous mills have ceased to operate.

In Kazan, on the tributaries of the Sviyaga River, there were formerly seventy mills which operated steadily. Scarcely thirty are left, which are idle during the summer for lack of water, and are operated with one-third as many millstones as formerly.

The influence of forest vegetation on the flow of springs and uniformity of stream-flow is manifested very clearly, says Mr. Toursky, in the upper basin of the Dnieper, where all the streams and small rivers issue from forested territory and have a regular and constant flow. In central Russia, on the contrary, deforestation has dried up the streams; in the grounds surrounding ancient manorial houses, fish-ponds have dried up and there is no water in the parks, where streams formerly flowed under ornamental bridges of bizarre forms.

According to Mr. Zbrojek, an expedition organized in 1894 by the minister of agriculture of Russia, and led by Lieutenant-general Tillo, found that the upper course of the Dnieper, in a heavily wooded region, holds thirty-four per cent of water per square verst; the Molenka and Nemochtnaia, the basins of which are less heavily wooded, retain twenty-eight to thirty-one per cent, while the Liodivitch River, the basin of which is entirely denuded, holds only thirteen per cent. In the basin of the Oka, the same commission found that the percentage of water held rises to thirty-nine per cent in the drainage basin of the Libotije River, which is pretty well covered with forests, while it is only twenty-nine per cent in that of the Traun, which is deforested.

In Russia, as in France, there are numerous historic evidences of the diminution of stream-flow. Streams have dried up in places where the remains of boats and other instruments of navigation are found and where the existence of navigation in former times is confirmed by old documents.

The lowering of the average stream level of the Scura at Pranzine from 1888 to 1900 followed upon extensive clearings on its watershed. A lowering has likewise been observed in the average stream level of the Bielaja at Oufa from 1887 to 1900, following upon clearings made on its upper watershed; on the contrary, the level remained the same at Grouzdevka on the lower watershed of the Bielaja, where the forests were preserved. The average stream level in summer of the Volga was lowered at Rybinsk, at Kostroma, and at Nijni-Novgorod, following the deforestation of that part of the watershed. The diagrams that accompany Mr. Lokhtine's report show this phenomena in a striking way.

These are the most salient facts and the most interesting observations pointed out by Mr. Lokhtine. It is very much to be regretted that Mr. Rabot has passed them over in silence and has not reviewed them with his well-known ability; it would have been very profitable to us.

The following conclusions are reached in Mr. Lokhtine's report: "Forests are a beneficial factor, acting favorably upon an abundance of water in a country, in general, and in particular upon maintaining an even stream-flow. It is for this reason that the destruction of forests should be considered dangerous."

These conclusions should be compared, moreover, with those at the close of Mr. Lauda's report, reproduced elsewhere by Mr. Rabot in the article cited above.

"The utility of the forest in general, as well as its great value in protecting the soil against landslides, appear the more vindicated, because, at the same time, it retains loosened soil, and its advantages from the point of view of the diminution of waste matter carried by the streams, especially on the watersheds of the sources, are so important that this reason alone should be a sufficient motive for undertaking reforestation as actively as possible."

II

We have tried to give in the first part of this study as complete and faithful an analysis as possible of the principal reports presented at the congress at Milan. We now wish to try to show that beside the facts and observations brought to the congress by Messrs. Ponti and Lokhtine, to cite only those two, there are others on which we are able to support a scientific conviction that the forest has a favorable action upon floods, and the maintenance of springs and stream-flow.

THE FOREST AND FLOODS

The principal factors that work together to produce floods are exceptionally heavy rainfall, the geological formation of the soil, and the topography of the land through which the streams flow. A very heavy rain falling for several days on very steep slopes composed of impermeable soil, such as those of the southern slopes of the Cevennes, ends to a certainty in dangerous floods,

like those that devastated Languedoc in the autumn of 1907 and very recently. Man is necessarily helpless in the face of meteorological phenomena, but he can lessen their consequences by protecting the soil against erosion, and by diminishing the proportion of detritus carried by the run-off. It is not necessary for us to offer proof upon this point, the truth of which is definitely admitted by Messrs. Lauda and Charles Rabot.

Since everyone is willing to recognize the efficacy of the "geological" role of the forest (to make use of the term employed by Mr. Rabot), it is a point calculated to make one concede also its action upon floods. The fact that the volume of detritic matter carried by the streams in periods of flood is notably diminished by the presence of the forest must have as a corollary a decrease in the violence of the floods, since it is recognized that the presence of the foreign matter borne along in the current greatly roughens the action of the water. In fact, this detritic matter—sand, gravel, pebbles, and rocks—torn from the soil by the stream, raises the level of the stream beds, increases to a large degree the density of the waters, and, as a consequence, their power of undermining, and aids in the erosion of the steep banks.

There is no lack of facts to establish this moderating action of the forest. Mr. Marchand gives an example of a torrent at Weissenbach, in the canton of Appenzell, Switzerland, which formerly became swollen at Weissenbach about three hours after the storms had burst upon the mountain; following a partial deforestation of the mountain, the floods became manifest at Weissenbach only one hour after the appearance of storms. The presence of the forest, then, had the effect of delaying by two hours the manifestation of flood, and of increasing by four hours the duration of the run-off.

Mr. Marchand has noticed a fact of a nature to prove that there is a diminution in detritus carried by the water because of the forest growth. In the

great forest of Ofen, canton of Grisons, he saw numerous mud-burdened channels deposit the sediment with which they were charged among the fir trees, and yield only pure, clear water where they issued from the forest.

The diminution of run-off resulting from the presence of forests must be attributed on the one hand to the retention by the forest foliage of a part of the rainfall, a fact verified by the experiments of Marshal Vaillant in 1866 in the forest of Fontainebleau, by those of Mr. Fautrat in the forests of Halatte, and of Ermenonville (1874-1877), and by those of Mr. Mathieu in the forest of Haye; on the other hand, to the innumerable obstacles, the boles of the trees and shrubs, the twigs, the dead leaves, and the inextricable network of roots, all of which break up the rainfall and delay the off-flow. But it is above all to the great absorptive power of the layer of dead leaves, of plant debris and humus, which covers the surface of the forest soil; of moss, herbs, and bushy plants, which grow under the leafy arches of the trees, which, altogether, form what we call the forest floor, that we must attribute the retention of the greater part of the rainfall and of the water formed by the melting of snow. This water, held at the surface, penetrates the soil slowly and unites with the subterranean waters which give birth to springs. A great part is absorbed, besides, by the roots of the plants in the ascensional movement of the sap, and forms a part of their nourishment.

THE RETENTION OF WATER BY THE FOREST FLOOR

The retentive capacity of the forest floor has been established by experiments made in Germany and in France, with great scientific accuracy, the results of which we will state briefly.

Gerwig admits that, upon a surface of one square meter, moss retains on an average 4,466 kilograms of water. Consequently, it is able to retain ten to thirty millimeters of water.

Investigations undertaken by Bavarian foresters upon the volume of water that dead leaves and other organic debris of the forest floor can absorb have been recorded by Ebermayer. These investigations have shown that one cubic meter of dry beech leaves absorbs two to two and a half times its weight of water, one cubic meter of dry needles of spruce and sylvester pine one and a half to two times its weight of water, and one cubic meter of moss two and a half to three times its weight of water.

The Bavarian foresters might be criticized for having experimented on leaves that were more or less stirred up, not lying as they do on the ground, the experiments having been made upon a certain volume of leaves dried in the air, heaped in a vessel, then placed in a sack, which was plunged into water and weighed after two days' saturation.

The lamented Julien Calas, chief guard of the forests at Prades, made experiments on the forest floor exactly as it lies on the ground. It was weighed the first time after complete saturation and the second time after becoming entirely dry through evaporation in the open air. According to Mr. Calas, oak leaves absorb nine times their weight of water, those of the beech and pine eight and five times their weight of water.

Finally Mr. Henry, professor in the national school of waters and forests, likewise experimented with the forest floor just as it lies on the soil. After a section of it had been plunged into water for several days, until it was completely saturated, he let it drain, weighed it saturated with water, then dried it at 100 degrees and weighed it again. He found that a carpet of spruce needles, taken as they lie and composed of leaves in all degrees of decomposition, absorbs on an average more than four times its weight of water.

Beech leaves, after twelve days of saturation, absorb 4.41 times their weight of water.¹ Mr. Henry concludes from his experiments that the spruce needles which cover the forest soil over one hectare can retain 105,825 kilograms of water; that is, a rainfall of ten and one-half millimeters for an average depth of .02 of a meter. As clumps of spruce retain in their tops and allow to evaporate there about half the rainfall, it would require a fall of 21 millimeters for the soil under the needles to begin to become moist.

It is evident that the retentive capacity of the soil cover is not infinite and that it fails following rains that are exceptionally heavy, such as those cited by Mr. Wolfschütz; but such rainfalls are fortunately rare, and neither the facts noted by Mr. Wolfschütz nor the hydrological observations of Mr. Lauda lessen the value of the experiments that we have just reviewed; finally, as the latter said, the data that we have gathered up to the present time is not sufficient basis for a final judgment.

We may wonder, it is true, that densely wooded river basins have been visited by disastrous floods. But is not the cause of this phenomena the more abundant rainfall there? We know absolutely that the presence of forests increases to a marked degree atmospheric precipitation. In mountainous countries, especially, forests cause frequent atmospheric depression because they block the passage of air currents and force them upward toward the higher strata of air, which are colder. The air within and above the forest is, moreover, colder and more humid than the surrounding air. The result is frequent condensation of the clouds into rains in the neighborhood of mountain forests. Consequently, it is not to be wondered at that the streams of the forested regions cited by Mr. Wolf-

¹E. Henry, Faculté d'imbibition de la couverture morte, *Revue des Eaux et Forêts*, June 15, 1904, pp. 353 to 361. According to M. Henry, the differences that appear between the results of his experiments and those obtained by the German foresters come from the differences in the degree of decomposition of the leaves. The further advanced the decomposition of the organic debris that constitutes the forest floor, the greater is the capacity of imbibition.

schütz have carried more water than the streams of the plain. But what it is necessary to know is whether, all other conditions being equal, and the quantity of the rainfall being the same, the rivers issuing from the wooded regions have a greater or less flow than those whose watersheds have been deforested.

Without going to Germany for examples, do we not know that the streams that descend from the departments of the Vosges mountains, upon which a good proportion of forest area has been preserved, do not have as frequent nor as disastrous floods as the torrents that plow the slopes of the denuded Alps, or the streams of irregular flow that issue from the deforested Cevennes (Ardeche, Lot, Tarn, Dourbie, Loire, Allier) or from the waste lands of the Central Plateau (Cher, Sioule, Creuse). The proportion of forest area of the Vosges is thirty-five per cent, while that of the Alps of Savoy is twenty-one per cent, that of the Alps of Dauphiny (Isere, Drôme, and Hautes-Alpes) thirteen per cent, that of the Alps of Provence (the Lower Alps and Maritime Alps) is twelve per cent, that of the Central Plateau and of the Cevennes, twelve and one-fifth per cent.

The meteorological bulletin of the department of Aude has given us some facts of value upon the effects of a storm that occurred September 12, 1893, which was the most violent of the year and caused considerable damage throughout the whole region. All the tributaries of the Aude experienced sudden floods, and that river rose five meters at Saint Marcel. But what occurred in the basin of the Salz is more worthy of attention. The storm lasted an hour and a half and there was a rainfall of sixty millimeters. The Blanque River, which unites with the Salz nine kilometers above Couiza, and which, like it, flows down slopes almost entirely denuded, immediately rose one meter and devastated a large amount of property along the river, especially at Rennes-les-Bains; at Couiza the flood was greater and the frightened inhabitants feared a repetition of the dis-

asters of 1891. In the basin of the Rialsesse, which flows into the Salz six kilometers above Couiza, the amount of the rainfall was sixty millimeters, also. However, this river did not overflow, nor cause any damage. It must be noted that if the Salz and the Blanque are fed by streams that flow down denuded slopes, the basin of the Rialsesse, on the contrary, is heavily wooded and 1,680 hectares have been reforested. It would be difficult to find a more striking example of the influence of forest cover on floods.

THE INFLUENCE OF FOREST GROWTH ON SPRINGS

Mr. Charles Rabot makes use of the assertions of Messrs. Lauda and Wolf-schütz to deny absolutely the favorable influence of forests upon the feeding of springs and the regulation of stream-flow.

However, the relation that exists between deforestation and the disappearance of springs is established beyond a doubt. The springs of Bresle dried up about 1840, after clearing off a forest of some importance, situated in the parish of Formerie (Oise). The source of the Arrivaux River descended toward Breuil (Somme) one kilometer soon after the forest of Cressy was cut in 1837. The clearings made in the forest of Arronaire were injurious to all the streams that flowed from it to Escout and Somme.

Mr. E. Charlemagne has given an instance to the point in the *Revue des Eaux et Forêts* of the disastrous effects that the heedless cutting of forests may have upon stream-flow. After the death of Don Bouthillier de Rancé, the abbé of la Trappe leased the iron works connected with the monastery to private parties for twelve years. It was necessary, according to the biography of Don Pierre the Dwarf, sub-prior of the monastery, "to destroy the forests of la Trappe in order to maintain the furnace fires, and it is impossible to tell how far-reaching the effects were. The springs soon dried up and the ponds

yielded water only six weeks in the whole year." This was written in 1715.

Near the little village of Orgelet (Jura) at the foot of the east slope of the Orgier Mountain, in the parish of Plaisia, there is a spring called the fountain of Plaisia, which disappeared during the entire time that the mountain remained cleared of its forests (from the end of the eighteenth century to the middle of the nineteenth) and reappeared thirty years ago when the work of reforesting the slope had been finished. Numerous inhabitants of the country testify to this fact.

Mr. Alphonse Mathey has noted an interesting fact in an article entitled "The influence of the forest on the flow and the regularity of springs." According to the testimony of the mayor of Flacey (Côte d'Or), the spring supplying his village had always had a constant and regular flow as long as the limestone uplands from the foot of which it issued, remained covered with a coppice of vigorous oak over an area of 100 hectares. At the beginning of the nineteenth century, this area having been deforested, the spring no longer had a regular flow and entirely ceased to flow the greater part of the time.

The same author recounts observations made by Mr. de Rothenbach, director of the water service of the city of Berne, on the flow of the springs of that city. The flow per minute of two of them, the Schliern and the Gasel, varied from one to two and seven-tenths and from one to four and one-tenth, while the variation of a third spring, that of Scherli, is represented by the numbers one and six and seven-tenths. Now, the basin of the springs of Gasel and Schliern is sheltered by a considerable mass of forests, while that of Scherli comes from a mountain partly deforested. These investigations clearly prove that the presence of the forest tends to give the springs a regular and constant flow. Other observations also prove that the forest, during dry times, gives out slowly the water that it has stored up during a rainy period. Thus

during the summer of 1893, which was marked by a long and destructive dry period, the spring of Scherli reached its smallest flow September 3, 1893; that of Gasel did not reach its low-water mark until three months and a half later; that of Schliern six months and a half later.

In Algeria, "the trees disappeared and the springs dried up," said Doctor Courchon; "in the canton of Bouffarik, formerly noted for its rich water supply, fifteen springs decreased in two years from 1,316 to 710 liters; rivers such as the Oued Chemla, which had a flow in 1864 of 150 to 180 liters, no longer yield more than from seventy to eighty liters; the Oued Kremis, which had a flow in 1864 of from 100 to 200 liters, in 1881 had a flow of only fifteen liters. The water supply of cities like Saint-Denis-du-Sig disappeared and water was shipped in over the railways. The water in the canals of the city of Algiers diminished from year to year. At the gates of the city a striking example of the dearth of water can be observed: Thirty years ago the Oued M'Kacel in its cool valley had the power to turn four mills; to-day water and mills have disappeared with the forest that covered Mount Bouzarea."

The eminent geographer Onésime Reclus cited the example of the city of Tunis, which was formerly supplied with pure water from the springs issuing from Mount Zaghuan, springs that have disappeared since the mountain was deforested.

The flow of the streams diminished notably at Martinique after the island was deforested, a result of extensive cuttings to make charcoal. In the same way the canal, made in 1867 by Admiral de Gueydon to convey good water to Fort-de-France, diminished considerably, and the government of the colony has very recently adopted measures to check the deforestation.

Mr. Crahay, inspector of waters and forests at Brussels, noticed at Planchimont that the flow from the springs of La Sure became more regular after the

region had been reforested with spruce for forty years. "One of them," he wrote, "that gave no water during the summer, never dries up now, and issues seventy meters higher on the slope than did the former spring. At Bois-le-François, parish of Villers-devant-Orval, after clearing away an old coppice forest, two springs disappeared. The place where the water issued can be seen yet, and the little channel that it followed down the slope."

At the International Congress of Silviculture, which was held at Paris on the occasion of the exposition of 1900, Mr. Grebe, forester councilor at Eisenach (Alsace), cited numerous examples of springs that had dried away or of diminutions in stream-flow noticed after deforestation in central Germany; he told, also, of cases where springs reappeared after reforestation had taken place. Another German forester, M. B. A. Bargmann, told of the disappearance of two springs in the valley on Saint Amarin (Alsace), after clearings had been made above them.

At the same congress, Mr. Servier, a landholder at Lamure-sur-Azergues (Rhône) gave several interesting facts. The region in which he lives having been until late years almost completely deforested, he noticed that wherever a cluster of trees remained, their presence was coincident with the existence of a spring. On the western outskirts of a coppice wood a spring exists; the flow of this spring diminished continually when the coppice had been cut; it became normal when the coppice had shot up again.

Observations made at the German forestry stations show that of 100 millimeters of rain water falling upon forested territory, ten and one-half millimeters evaporate; twenty are arrested by the crowns of the trees, twenty-five are retained by the forest floor. Forty-four and one-half, then, reach the upper layers of the soil. On open ground, evaporation consumes sixty-eight and three-tenths millimeters. Only thirty-one and seven-tenths millimeters, then, penetrate the soil. If the quantity of

rain was the same in the forest and outside, the presence of the forest would augment, then, by twelve and one-half per cent, or about one-eighth, the proportion of water absorbed by the ground.

Without doubt, it is very difficult to prove incontestably the influence of forestation or deforestation upon a particular spring, as it is impossible to exactly determine the area that feeds the spring. Nevertheless, the observations that have just been cited, and to which many others could be added, justify us in arriving at conclusions favorable to forest influence.

The facts verified by Mr. Fautrat in the forest of Halatte (Oise), by Messrs. Mathieu, Bartet, and de Drouin de Bouville in the forest of Haye (Meurthe-et-Moselle), from 1867 to 1898, establish beyond a doubt that more rain falls over forest areas than over open country (twenty-three per cent, on an average); this increase of rainfall is not, moreover, counterbalanced by the retention of a part by the foliage of the trees. The diminution of evaporation and of surface off-flow resulting from the presence of the forest contribute equally to favor the nourishment of subterranean sheets of water, which give birth to springs. We can say, then, with Mr. Hüffel that "the forest is the mother of rivers, as our fathers declared," and that "the work of modern science has only confirmed the relationship, recognized at all times and universally, which binds the spring to the tree that shades it."

Mr. Hüffel has, moreover, described in his *Économie Forestière* the experiments carried on since 1900 in the valley of the Emmenthal, by the Swiss central station of forestry research, in order to compare the flow of two water courses, one issuing from a basin containing only eighteen per cent of forest area, the other from a basin covered with forest over ninety-one per cent of its area. The learned professor has just announced that the verifications made up to the present have established:

First, that at the time of the maximum of high water, the channel of the deforested region carries thirty to fifty per cent more water per unit of surface than the wooded region.

Second, that after prolonged dry periods, the springs of the deforested region dry up completely and the bed of the stream is dry, while the stream from the wooded valley is still yielding at least five liters of water per second.

Is it necessary to call attention to the fact that the observations of the Swiss foresters are in complete contradiction to the measurements of Mr. Lauda in Moravia, measurements given, moreover, with express reservations which we have cited above and that weaken very much the conclusions that some have wished to draw from them, hostile to the influence of the forest upon streams and springs?

FORESTS AND THE REGULATION OF STREAM-FLOW

"Forests," says an eminent geographer, "play an important role in the regulation of rivers. They retain for some time the rainfall and lessen the volume of flood flow. Wherever forests have been destroyed, stream-flow has always become more irregular and floods have increased in number and violence."²

The clearings made throughout the basin of the Mediterranean caused a diminution in the flow of the streams. Crete no longer has the superb forests of Mount Ida, in which the infant Jupiter was concealed, guarded by the naiad Amalthea. It has only floods now. One would search Greece in vain for the cool shadows of Algidus, the black forests of Erymanthus, of Taygetus, and of verdant Cragus or the famous forests of Dodona from whence Oropus was born, sad Acheron and Thyamis. All these rivers with the poetical and pleasing names, of which the an-

cients have left us faithful descriptions, became unimportant streams after the mountains from which they issued had been stripped of the forests that covered them.

The rivers of Asia Minor, issuing from deforested uplands, have likewise changed in stream-flow; they are burdened with an enormous amount of detritus, and their beds are incumbered with deposits of sand and gravel which are an obstacle to navigation; several rivers have disappeared completely. Numerous streams in Asia Minor which were still navigable in ancient times and in the middle ages became inaccessible to boats after the region had been deforested. This was the case with the Cestros (Ak-su), with the Calycadnus (Ermenek), with the Sangarius (Sakaria), and with several streams flowing into the Black Sea described as navigable by Arrian.

In the northern part of Korea, where the forests are still intact, the variations in the level of the water courses are insignificant, while in the southern part, where the forests have been almost entirely destroyed, floods develop rapidly and unexpectedly.³ Vicomte de Vaulserre, who explored in 1898 the course of the Yang-tse-Kiang River from Su-chow to Ta-li-fu, attributes the enormous variations in its flow and the flow of its tributaries to the absence of forests on the mountain slopes of Thibet, which constitute the upper basin of this river.⁴

The Russian rivers are valuable means of communication in a country almost destitute of railways. For a long time they were the only means of communication, by boat in the summer and by sleds in the winter. These "are the allies of the Russians against that which they call their great enemy, distance,"⁵ and they have contributed not a little to the conquest and unification of the empire. "Unfortunately," says again Mr. Caména d'Almeida,

²P. Caména d'Almeida, *la Ture, l'Amérique, l'Australasie*, Paris, 1904, Colin, p. 103.

³J. Deniker, *la Géographie*, V, 1^{er}, 1902.

⁴*La Géographie*, I, 1^{er}, 1900, p. 451.

⁵A.-P. Rambaud, *Histoire de la Russie*, Paris, Hachette, p. 8.

"people have not been wise enough to preserve these rivers throughout the country in their primitive condition. The extensive cuttings made in the forest regions of the central part have brought on disastrous results, a diminution in the rainfall, too rapid melting of the snow, the carrying away of the agricultural soil, a greater diffusion of the sands of the southeast, which form bars in the rivers, in the Volga especially, detrimental to navigation." In summer the bed of the Volga is incumbered with sandy shoals; sandbanks are heaped up at the confluences and navigation is impossible from Tver to Rybinsk except through a beacon-lighted channel. "These inconveniences have been increased by the heavy cutting of the great forest region that the Volga traverses." The width of the Don is thirty kilometers; but during the low-water period, the bed of the river is obstructed with sandbanks, which make navigation impossible.

According to a Russian engineer, Mr. Maksimovitch, the Dnieper River is fed by the marshy forest regions of the central plateau of Russia, in which its upper tributaries have their source. In the forest zone which extends southwest as far as the outskirts of Kief, thirty to forty per cent of the land is forested and the rainfall reaches 400 millimeters; in the region where forests occupy only from twenty to thirty per cent of the territory, condensation is less frequent and the rainfall does not go beyond 300 millimeters; in the neighboring regions of the steppes where the percentage of forest area is only one or two, although the sky is frequently overcast with clouds, they but rarely condense, as a natural consequence of the warmth of the denuded soil and the absorption of the water vapor by the equally warm atmosphere, and the rainfall reaches no greater a depth than 200 millimeters.

In Australia forests cover only five and six-tenths per cent of the territory; they are found only on the western coast, in the southeast part of southern Australia and to the east upon the

high plateaus and the slopes of the dividing range. Rains are rare and the precipitation small, except upon the eastern coast and to the southwest of Westralia; the basin of the Murray is almost entirely barren and dry. Sometimes a whole year passes without a single drop of water falling in the central region west of Spencer Gulf. The stream-flow shows extreme variations everywhere in the Australian continent and the rivers are generally unfit for navigation.

In spite of the immense extent of its basin, which is more than a million square kilometers and equals that of the Ganges, the Murray River, longer than the Rhine, discharges hardly 350 cubic meters per second at its mouth, which is less than the Seine discharges at Paris. The discharge of the Murrumbidgee, the length of which is 2,160 kilometers, is also one of the most irregular; it often inundates the lower parts of the district of Riverina, but at certain seasons its bed is nearly dry as far as Hay. At the time of rains the Darling has formidable floods; it rises thirteen meters and its bed is extended for a length of ninety-six kilometers; its volume during some days is from 40,000 to 45,000 cubic meters per second, four times more water than the Loire carries in flood. The rest of the year this river, which is 3,124 kilometers in length (nearly the length of the Indus or the Volga), shows, between its deep embankments, only putrid, motionless pools; it ceased to flow during eleven months, from February, 1902, to January, 1903; from 1877 to 1886, ten years, there were only fifty-seven months that it could be used for navigation. In 1902 the Lachlan, another tributary of the Murray, 1,120 kilometers in length, was dry for nine months.

The Australian rivers have great erosive power and flow between steep banks, which often have a height of fifteen or twenty meters. Along the lower course of the Murray, the river flows between two escarpments from forty to forty-seven meters in height;

the naked roots of the gum-trees hang sadly from the top of the compact clay banks.

The Ohio River, which descends from the now denuded slopes of the Alleghany Mountains, "is the cause of the largest and most disastrous floods in the Mississippi."⁶ The streams swell very rapidly in the southern and western part of the Alleghanies, and it is not unusual for a river to rise twenty meters in a few hours.

On the banks of the Kansas River, a tributary of the Missouri, one can observe the remarkable effect that forest vegetation has in protecting the soil against erosion by floods. A stretch of about two hectares, which had been deforested in 1900 was carried away in May, 1903, by a flood. The steep bank of the river, being no longer protected by the trees that had grown along the edge, was swept away and the flood covered twenty-four hectares of arable land with sterile sand. Above this point, where the owners on the river had taken care to preserve the trees along the edge of the bank, the flood caused no erosion.⁷

It has been verified in the United States that the flow of the rivers and streams has decreased in all deforested regions. Certain streams near Boston, the power of which was formerly utilized in manufacturing enterprises, no longer have sufficient flow and the manufacturers have been obliged to use steam. The tributaries of the Connecticut have diminished considerably in volume and the beds of some are dry during summer.⁸

Mr. T. P. Lukens reports in the magazine *Forestry and Irrigation* a striking example of the influence of forests in regulating stream-flow in southern California. The basin of the San Gabriel River, which includes an area of 222 square miles, having been burned over by fires that destroyed all the forest vegetation, the flow of the

stream at low water was reduced to ninety inches. During the same period the minimum flow of the San Antonio River, the basin of which, 267 square miles in extent, was forested over more than one-half the area, did not fall below ninety inches [190 inches according to Mr. Lukens' account].

In the same journal Mr. W. B. Greeley gives an account of some investigations made by the United States Forest Service from 1901 to 1903 of the flow of the Esopus and of the Wallkill, tributaries of the Hudson River. The drainage basin of the latter stream, of clay and marl formation and with moderate slopes, contains five and four-tenths per cent of natural reservoirs (lakes, swamps, or ponds); eighty-five per cent of the area is cleared. The basin of the Esopus is of permeable soil; the topography is very irregular and the slope in general twice as steep as in the basin of the Wallkill. Clearings have been made over only fifteen per cent of the area. The precipitation and temperature being the same in the two basins, it has been found that the average deviation from the mean weekly flow in the two streams, during the three years, was seventy-eight and one-fifth per cent for the Wallkill and eighty-three and seven-tenths per cent for the Esopus. The presence of forest growth in the basin of the latter stream counterbalances the unfavorable conditions of topography, and geologic formation of the soil and the absence of lakes and other natural reservoirs.

A publicist whose economic studies of Germany and the United States have classed him as without an equal, writes in regard to the forests of Canada: "Recent federal laws have just regulated the cutting of timber, which was carried on formerly in too destructive a manner. The people have come to the conclusion rightly that forests were not to be considered only as 'a collection of trees to cut down and make into

⁶P. Caména d'Almeida, *la Terre, l'Amérique, l'Australie*, p. 192.

⁷*Forestry and Irrigation*, Washington, February, 1904.

⁸J. Lefavre, attaché au Consulat général de France à New York. Rapport au Ministre, Bull. Min. Agriculture, fasc. B., 1885, imprimerie Nationale.

timber,' but that they should be in part preserved, because they store up the rainfall, feed springs, regulate stream-flow, and thus prevent disastrous floods, such as were witnessed only last February and March in Pennsylvania and Virginia, where cuttings have been made without thought of the future."⁹

In France we have numerous proofs of a notable diminution in stream-flow. The Durance, which rises in a partially deforested drainage basin, has become absolutely unfit for navigation or for floating timber. Yet, at the time of the Roman occupation, there was an important organization of boatmen on that river.

The Loire was formerly a navigable channel of the highest order, which afforded sure communication between Nantes and the central provinces. In 1551 the Marquis of Northampton, ambassador from England, went from Orleans to Nantes, with his suite, in "five large, many-cabined boats." Numerous pictures dating from the eighteenth century represent Orleans and Blois animated with veritable flotillas of boats of every kind.

At the time when Gaston d'Orléans was exiled to Blois by Richelieu (1634-37), he went down the Loire by boat as far as Brittany, having "dinner and soup served in beautiful, shady places" when he found "some beautiful and pleasant isle." At that time these covered boats were called galliots; they carried in them "a large amount of provisions and a retinue of servants, as well for the kitchen as the wardrobe."¹⁰

Madame de Sévigné went from Orleans to Rochers by "the delightful route of the River Loire" and found at Orleans twenty boatmen around her, "each one displaying to the best of his ability the rank of the people he was conveying and the beauty of his boat."¹¹ Steamboats furnished service as far as Nevers during the first half of the nineteenth century.

Upon the Allier, transportation by boats was flourishing. Madame de Montespan, returning in 1676 from the watering place Bourbon-l'Archambault, embarks at Moulins, upon a painted and gilded boat, the interior hung with red damask, and adorned with pennants displaying the arms of France and Navarre. In 1819, the passage of 2,178 boats was recorded at Moulins; this number rose to 3,524 in 1820, and to 4,718 in 1823. In 1837, 100,000 hectoliters of coal were unloaded annually at Pont-du-Château. A line of steamboats carried from Pont-du-Château to Vichy and Moulins in 1845 20,000 passengers and 30,000 to 40,000 tons of merchandise. In 1890 only ninety-four tons of fuel and timber were carried down the Allier; there is no navigation ascending the river.

At the present time navigation, almost null on the Allier, is impossible on the Loire above Saumur. The bed of the river has risen with frightful rapidity because of the enormous volume of matter torn from the soil of the mountains of the central plateau that it carries with every flood. It has been shown in fact that the remains of Roman villas recently discovered on its shores are several meters lower than the present level of the river. It is the same with the old Roman churches, into which it is necessary to descend as into caves, and yet it is impossible to suppose that their architects built them below the level of the river. The building of dikes, instituted in the seventeenth century along the Loire to protect the cultivated fields of the valley against the overflowing of the river, coincides exactly with the time of the clearings made on the mountains of the central plateau, that Colbert tried in vain to check.

Forests cover hardly thirteen per cent of the area of the drainage basin of the Loire, which is, moreover, composed of impermeable ground. The

⁹Jules Huret, *En Amérique, de San Francisco au Canad*, Paris, 1905, E. Fasquelle, p. 461.

¹⁰Nicolas Goulas, *Mémoires*.

¹¹Mme de Sévigné. *Lettres à Mme de Grignan*, 9 Mai, 1680; 16 Sept., 1684; 21 Mars, 1689, etc.

mountains of Velay, those of Vivarais, of Forez, and of Margeride, the group of the Dômes and of the Dore Mountains, show denuded slopes in every direction, favorable to a surface off-flow, furrowed by water channels and gullied by erosion; the plateaus of Millevaches and of Gentioux contain only sterile wastes, impotent to arrest the action of flood waters.

On account of deforestation the Loire, like the Allier, is no longer in summer anything but a great stretch of sand. Let a storm come, a sudden thaw in spring, or prolonged rains in the autumn, "every depression of the ground gathers a torrent, every ravine confines a river, and all these waters, accumulated in the valley of the Loire, form a roaring sea, which reminds one of the great rivers of America."¹² At Roanne, the flow at low water and the flow at times of flood is in the ratio of one to 1,458. The flow at Orleans oscillates between twenty-four cubic meters per second and 7,500, which is more than 300 times the flow at low water. Five days are sufficient to restore the almost dried-up river and to raise the water level to six or seven meters.

The Pyrenees offer numerous examples of the sad effects of deforestation upon stream-flow. Dralet, in his "Description of the Pyrenees," published in 1813, tells us that the Tet, a small stream of the eastern Pyrenees, could not be used to float rafts and timber after the removal of the forests that covered a part of its upper drainage basin. The Salat and its tributaries, likewise but lately floatable, are only torrents now that the mountains that overlook their valleys have been cleared of forests. In the parish of Saint-Girons one can see yet in a wall built in 1130 chains which were used to hold rafts; in 1813 they were found to be at an elevation of one meter and had become useless, the navy no longer finding wood to cut in the territory around Seix and Castillon. The Salat

was formerly navigable from the port of Saint-Girons to its confluence, and the village of Lacave, sixteen kilometers below Saint-Girons, was at that time the center for the building of boats for river navigation.

Numerous documents preserved in the municipal archives of Pamiers prove conclusively that in the thirteenth century the Ariège was navigable from Pamiers, while at present it is navigable only for thirty-one kilometers, below Cintegabelle. At that time the city of Pamiers had a great trade in wines, which they shipped by water as far as Bordeaux. In the eighteenth century people still went by boat from Pamiers to Toulouse and vice versa. The Ariège was used also, as was the Hers and the Arize, for floating logs. The flow of all these streams has constantly diminished because of deforestation.

In the eighteenth century logs were floated on the mountain river Aspe, whose union with the torrent of Ossau forms the River of Oloron. From 1705 to 1780, the royal navy cut in the forests of the Valley of Aspe timber for masts, which was floated at Athas in rafts thirty-three meters long and four and six-tenths meters wide and driven to Bayonne. It would be impossible to accomplish this to-day. The mountain river Aspe, as also the Ossau and the Oloron, has become an unruly torrent, and its flow, which varied a hundred years ago from thirty-three one-hundredths of a meter in summer to one meter when the snows melted, varies to-day from ten meters to two and seven-tenths meters. During more than eight months the depth of the water does not go beyond one-half meter. This diminution in the stream-flow and increase in the difference between the high and low water mark, are the result of deforestation. In 1813 there no longer remained of the forest of Issaux, which for fourteen years supplied the navy with trees of the largest size (one and six-tenths meters in diameter at the base), anything but *the*

¹²F. Schrader et L. Gallauédéc, *Géographie de la France et de ses Colonies*, p. 143.

soil, bare and dried up. The forests were laid waste during the revolutionary period; the devastation of the woods, over pasturing, clearings, and fires have so reduced the forested holdings that stony and denuded slopes appeared in the valley instead of verdant forests of fir and that "immense stretches of greensward, dilapidated, have given place to gray rock, like a mantle worn even to the thread." The forest of Issaux, which extended in 1765 over 3,580 hectares, covers only 1,380 hectares.¹³

The Adour, at the beginning of the eighteenth century, still floated the mountain timber; it is no longer navigable in the province of Hautes-Pyrénées since the destruction of the immense forests of Baudéan and of Bagnères, which covered a part of its drainage basin. "Every autumn now all the mills in the lower valley, being without power, are idle for months."¹⁴

Finally, the Garonne, frequented before the Roman conquest by the boats of the Gallic tribes which conveyed to the markets on the two shores of the river the pottery made by the inhabitants of Tolosa, later a vast emporium for merchandise, coming from Rome, from Arles and Narbonne to Aquitaine, traveled unceasingly by associations of boatmen (*scapharii utricularii*), whose privileges were afterwards recognized in the twelfth century by the counts of Toulouse and became in the fifteenth century the source of considerable fortunes for the trading corporations—the Garonne is subject to floods during which its volume increases to 262 times the low-water flow, and threatens the city of Toulouse with its terrible inundations, so severely experienced in 1875. Modern geographers do not hesitate to attribute this sad state of affairs to the deforestation of the Pyrenees.

But the relation that exists between the denudation of the soil and the change in the rate of stream-flow had been noticed for a long time by the

wise observers of this region. In the eighteenth century Froidour pointed out the fact that the forests near the banks of the Garonne had been laid waste and wrote that it was urgent "to take an interest in replanting them." A century later, Dralet uttered a new cry of alarm. "Several rivers formerly navigable or floatable," he wrote, in 1813, "lack water in the summer only to the degree that the mountains in which they rise have been stripped of their pastures and forests." Elsewhere he says: "If tradition and ancient documents are consulted, it will be found that several streams, formerly floatable in the valleys, can no longer be used at all, or at least until after their confluence with other streams in the plains; this misfortune has come in those parts of the chain where the inhabitants have made extensive clearings, while the rivers and streams in the valleys where the forests have been respected have kept their volume of water."

The belief that the presence of forests exerts a favorable influence in preventing floods and in sustaining springs and streams, is not a new one, as we have stated. Eleven hundred years before our era Tiglath-pileser, King of Nineveh, undertook the good work of reforestation on the plains of Mesopotamia and upon the barren slopes of Mount Masias. The inscription carved on the rocks of Bavian near the springs of Haser, tells us that Sennacherib also had forests planted. Pliny the Elder, the celebrated naturalist, pointed out in his time floods caused by clearings: "*Plerumque vere damnosi torrentes corrivantur detracta collibus silva, continere nimbos ac digerere consueti.*"

From 1684 the engineer, Viviana, taught, in relation to the floods in the Arno, that the presence of forests supplemented the action of dams in holding back water and preventing erosion.

At the beginning of the nineteenth century, as we have seen, Dralet attributed to deforestation in the Pyr-

¹³Pierre Buffault, *Forêts et Gaves du Pays d'Aspe*, Bordeaux, 1904, imp. J. Durand.

¹⁴L. A. Fabre, *L'Erosion pyrénéenne et les alluvions de la Garonne*, Paris, 1902, A. Colin.

nees, the diminution that had become apparent in the flow of the streams that had their sources in these mountains.

In Italy, Perelli, and Paleocapa also, in 1841, admitted that rainfall is partly retained by the forests. Paleocapa affirms also that the increase of floods is the result of denuding the mountains. Lombardini also in 1858 maintains that the forest retains the rainfall and delays the arrival of the afflux in the channel.

"The destruction of forests, the failure of perennial springs, and the existence of torrents," Humboldt wrote, "are three phenomena closely interconnected." "After deforestation," he says, at another time, "water flows unchecked, without having time to infiltrate; it carries away the soil from the slopes, gathers in every depression of the ground, and forms torrents that hollow out channels and force along masses of sand and pebbles, which are left upon the surface of the lower lands or are carried into the rivers that receive the flood waters." Can the ravages made by the torrents from denuded mountains be more clearly described?

In 1797, Fabre, the engineer, in his "Essay on the Theory of Torrents and Streams," had drawn attention to the ravages of torrents and pointed out as the original cause of their formation the destruction of the forests that covered the mountains. The protective action of forest foliage upon the soil, the retention of a part of the rainfall by the humus, the diminution of the volume and swiftness of the waters by the presence of bits of trees and clumps of underbrush were well understood and described by him. Later Mr. Dugied, a former chief magistrate of the Lower Alps, in a memorial addressed to the minister of the interior, attributed the desolation into which the department was plunged to the destruction of the forests and the mania for clearing land.

Moreau de Jonnés, in a memorial crowned by the Royal Academy of Brussels in 1825, maintains that mountain forests feed springs and increase

stream-flow, and he affirms that "their conservation and extension are measures of public economy no less indispensable to modern society than the dredging of streams or the making of canals." This is the opinion of Michel Chevalier, also, in his work on "The Material Interests of France." According to the eminent economist, the navigability of streams would be greatly improved by "the replanting of the mountains that have been stripped of their woods with such great lack of foresight and have been abandoned in their nakedness with guilty indifference."

Finally, shall we add that Mr. Alexandre Surell, in his authoritative work on "The Torrents of the Higher Alps," extolled reforestation as the efficacious remedy for the disasters engendered by the incessant development of torrents? He was the great promoter of the work of reforestation.

There is in France at the present moment a marked reawakening of the forestry idea, which is the result of the influence, already old, of writers like Michelet, economists like Michel Chevalier, and of engineers like Surell and Cézanne. The professional foresters, born but yesterday, count for little in this movement. At its head we find among the geographers: Onésime Reclus, Schrader, Caména d'Almeida; physicians, Léon Petit, Trolard; the poet, François Fabié; the artists, Saint-Saëns; among publicists and statesmen: Pierre Baudin; finally, among powerful organizations, full of ardor for the prosperity and upbuilding of the country, composed of engineers, bankers, manufacturers, merchants, and so forth: The Touring Club of France, the Loire Navigable, Southwest Navigable, Association for the Forest Management of the Mountains, Society of Friends of the Trees, Reforestation League, and others. It would be much to be regretted if upon the evidence of experiments, more or less conclusive, made beyond the Rhine, the import of which, moreover, has been singularly

exaggerated—especially when other experiments, quite as important, lead to opposing conclusions; when facts that have been observed and historic proofs abound to attest the influence of forests in regulating stream-flow and sustaining springs; when, moreover, final judgment could not be pronounced on so complex a question at the present stage of our knowledge—if this movement should be checked, if the zeal displayed by disinterested men should change to sterile skepticism, and if the

efforts put forth to develop national wealth and industry should remain henceforth impotent.

Let us remember that if Germany is endowed with an admirable network of streams of more than 27,000 kilometers, the possession of which contributes not a little to the constant growth of its trade, both domestic and foreign, she owes it largely to the very considerable proportion of forests (twenty-five and eight-tenths per cent) that are included in her territory.

STORIES TOLD IN RANGER CAMPS

By CHARLES HOWARD SHINN, Supervisor of Sierra National Forest

Number 2

I AM never surprised at anything that I hear in this vale of tribulation, especially at a ranger camp-fire. One is apt to get new and strange views of many sorts. But I think the history that grows instinctively about a mountain camp-fire is especially worth the attention of the psychologists.

One of the rangers had picked up a week-old country newspaper; it contained a kidnapping story.

"Ought to hang a man that would steal a baby," he said, shoving the paper under the back-log.

"Huh!" said the much-read ranger who loved to tell about things. "That's nothin' to them scalawags that used to live in Egypt. Stole boy babies for a regular game."

I rolled up my memorandums and curled down to listen, wondering

whether this was to be a tale of cruel gypsies or of dreadful man-made Quasimodos.

"Go ahead, Tom. Trot her out. Tell us about it right now."

"Well, once I had a hist'ry teacher who used to 'liven up the Friday afternoons by givin' us all sorts of interestin' facts,—real gospel facts, you know. This particular one was about a tribe of Turks that lived next door to the pyramids. They was big men, all dressed up, and they did professional fightin' for the emperor of Egypt."

("It was ye Soldan of ye Faithful, in the days of ye lovely Princess Sabra," I murmured softly to myself.)

"In this here tribe of fighters, each man wore a horse-tail, an' some of them three horse-tails, an' each man had a camp kettle, an' when it was empty he

went an' threw it down at the emperor's door an' made a row till he got some grub.

"Each man carried two half-moons of swords in a great belt three inches wide, an' he wore carpet slippers with his name worked on in pearls, an' he had four white horses, splendid, well-kept up, an' several slaves of both kinds, an' the only work he did was fighting for fun an' carrying off loot, an' ridin' proud in processions."

"That sounds bully," said one ranger, "who were those ducks?"

"They called themselves Mammy Lukes, the teacher told us. Queer name, but, then, it was because of their main trick of stealin' babies. They used to ride all over for hundreds of miles an' they picked out the strongest an' spunkiest boy babies an' took them into camp an' brought them up to be Lukes, too. That's how the tribe was called Mammy Lukes. Fed 'em, trained 'em, made 'em regular fighters; several thousand baby Lukes all runnin' around an' gettin' prizes for killin' the Emperor's enemies."

"Hm-m. Don't think much of that game, first kidnappers an' then nusses, every one going around with half a dozen stolen kids yellin' at his heels! I always thought Turks had some dignity, and when they weren't fightin', set cross-legged in the shade and smoked an' drank coffee. But your mammy tribe couldn't have done no real fightin' with all those kids part and parcel of the muss."

"Lot you know! They wasn't fools. Naw, they took nusses an' slaves an' had the young ones brung up from the word go. No trouble. All discipline done on the side. Big Mammy Luke rides down a thousand miles from north end of Asia—has a woman nuss in charge of one of his slaves, packin' a small boy. Takes him to the boss, 'Here's the finest boy in them north tribes; put on the mark an' the number, an' set him practisin' shootin'.' Then he goes off; all through with his trouble. Twenty years later, when he is gettin' old, there ranges up a fine

young fightin' Mammy Luke, an' the old coot sees, by the tattoo mark on his arm, that it's the same, growed up, an' they wade in together, swingin' their swords against the enemy."

"Bad lot!" said another ranger. "Who killed off them fellers?"

"Huh! You evidently don't appreciate them fighters! But if you want to know, after they had been up agin' all kinds of famous generals from Alexander to Napoleon, they come a time when the whole tribe got sassy—don't know why? Then the emperor of that time invited them to a peaceful confab, an' the dam' Mammy Lukes rode careless into a big court-yard, an' the emperor fired his six-shooter an' off comes the cloths from hundreds of loaded cannons on the walls and the emperor had 'em killed, but even then they nearly cut their way out and made a new emperor. That ended the whole tribe for keeps."

Alas! The name Mehemet Ali had been forgotten! But how clearly the wild Mamelukes shone out across the tale!

"Four white horses, an' plenty of horse feed!" said a ranger. "That part of it struck me. I don't admire white plugs myself, but that's incidental. Four!"

"Yas," said another, "I remember that fellow that peddled soap an' sold minin' stock told a yarn about a place in South America where hosses was even plentier an' better than with them black Egyptians, an' all colors, too. Them Egyptians was all coal black, I suppose, an' they set themselves off with white hosses."

"Let's have that yarn."

"Well, the fellow said as how there was once a tribe of people named Aracarians—queer name that. They lived somewhere south of Peru, down towards Patagonia. They hated all the Spaniards. When a young brave wanted to marry, he had to kill three Spaniards first. They had a river. I remember its name cuz it was so queer—Bio-Bio—an' on an island in the middle of that river grew millions of crab-apple trees. The women went

there an' made slathers of hard cider; then the men went and held an election every year—gave their weapons to the women, an' got awful drunk. Sometimes the whole tribe went away with thousands of the splendid horses an' lots more they took from the Spaniards, away back to valleys of the Andes. When a brave rode out, his servants kept bringin' on a string of fresh horses, an' they changed saddles every hour, goin' like the wind, always travelin' to war, or comin' home.

"There never were such men anywhere else, such giants of fellows, fearless, and a terror to their foes. The soap peddler said they had first-class chiefs, an' they built up a kind of republic of their own an' drew a line between their land and that of the Spaniards. But at last, he says, the Spaniards come down very still an' quiet an' with an' army, took the country, built a city they named Valdivia, an' began to mine for gold. Then down from the high mountain valleys rode these horsemen, thousands of 'em, and they tore the settlement all to pieces. Then they took the chief Spaniard an' set him down on a chair, an' promised him plenty of gold, since that was what he seemed to want. Then they melted a heap of gold and poured it, all hot, down his throat—and went back to their Andes."

"That's great!" said one ranger. "How much of that is true?"

"A whole lot of it," I said, coming to the rescue of the story-teller. "The Araucarians of Chili were a wonderful and a heroic race of men before the vices of the whites conquered them. They were the Cossacks of earlier South America as far as horsemanship went, and nobody knows how much trouble they gave the successors of Pizarro. They really 'came into camp' to the Chilians about 1870."

"Guess I'll try to get an exchange into some forest down there in Chili," said one ranger.

"You will have to have a new language and a new religion, and otherwise hit a new gait altogether. Besides, these things happened a long time ago.

Caupolion, the chief, who once traveled with his ten wives and his 500 picked horses, and who sat at the head of the tribe when they caroused on the Island of Crab-Apples, was dust, with all his belongings, ages ago; his land is changed into farms and fields, and I guess some of his descendants are plowing there now."

"Seems to me very often when I hear about things," said another ranger, "as if I had come into the world some too late. It would bust me up if I let it strike in deep."

"Onc't I took out a party of nice fellows from Philadelphia," volunteered a third retailer of old stories, "and they had a book they read out loud in camp. It was all about a great, fine, expensive French cardinal named Rishloo. He was mighty good to his friends and mighty stiff with his enemies. Then there was a green young feller from the country that had a rusty old sword and rode a buttercup-colored horse. He fought everybody that poked fun at him. Pretty soon he was chums with the best bunch of fighters in France and up against old Rishloo who bossed France about then."

"What was the king doing?"

"None of them kings counted for anything. But I wish I could run across that book again. I wish some fellow who knew how to read out loud in good shape could read that thing to our camp next winter."

"It's in the ranger library," said another. "It's *The Three Musketeers*. One of the big guns from Washington wrote his name and gave it to the boys."

"Is the fightin' kid that rode the buttercup-colored horse in it?"

"Sure."

"Well, you show it to me next time we hit headquarters. That's the sort of history I like. None of your old Turk kidnappers, nor your Dago cider drinkers. I don't call that no novel. That book just writes down things exactly as they happened to real live people."

"They happened pretty durn quick and frequent for history."

"Mebbe, but then the world was younger an' folks was livelier in those days. Seems to me that nobody of any consequence had any work to do; nobody wanted to get rich; soon as you corralled anything, you blew it in."

"I suppose that went on for ages, everybody having a good time, till the land wore out and the timber was cut and the game all gone, and the whole thing badly wrecked and tangled up with thieves and loafers on top. Probably that's why people have to work so hard now, and so many things are all wrong. I must say I don't admire those happy-go-lucky fighters. Somebody always pays for their keep."

This last ranger, who was grizzled and worn with the cares of life, rose

and rolled the camp-fire logs together, and sat down in silence. A little of his idea filtered through the minds of the youngest rangers and shone in their eyes. Through some strange process of thought, broken fragments of stories they had gathered up here and there, so full of blunders, so curiously tangled and transformed, had, nevertheless, left in their minds some sense of the realities of life. They could not put it into words, but they saw that always, since the world of men began, some things lasted and others perished.

"I guess," said one, as he began to roll up in his blankets, "that decent fellows have always had to work hard at something. Mostly, too, it's better fun than the other way."

NIGHT IN THE WINTER WOODS

Rank after rank the patient trees
Rise up against the sky,
Strange voices whisper in the breeze
That sways their heads on high.

Beneath lies silence, robed in white,
Broad billows like the sea,
Her garments all with gems alight,
That gleam mysteriously—

The world of men, and all it holds
Of care, is far away;
Here's naught but peace, the night enfolds
To hide the scars of day.

—J. B. Carrington in *Outing*

Economic Selection and Processing of Raw Materials in the Paper Industry

By MARTIN L. GRIFFIN, of the Emerson Laboratory, Springfield, Mass.

THE selection of raw materials and the most economic treatment of them, or the determination of the normal product from a given raw material, is a most important question to decide by those already in the business or by others contemplating it. Failure to grasp the significance of this results in economic waste and loss of profits. The artistic and commercial value also of the product will often suffer seriously.

The manufacture of paper naturally lends itself to the tempering of such raw materials as result from other industries. To a considerable degree it is the treatment of by-products. It is, or should be from the very start, a building-up process from the raw material. In a considerable sense, it is a plastic art wherein the composition of the finished product bears little resemblance to the original raw stock.

The textile industry creates value in cotton by the mechanical processes of labor without changing its nature; the paper industry, taking the residue of this and other industries, creates a new value by mechanical and chemical treatment; and, without spinning and weaving, molds a product comparable with the finest fabrics. How great then will be the gain to civilization when the principle involved in this illustration becomes the ruling spirit in paper making!

The manufacture of paper has made enormous strides and has been highly developed during the last few years, but has, unfortunately, lost ground at many points in economic treatment. The extravagant consumption of paper has

brought with it extravagant methods of manufacture.

Sawmills producing lumber for structural and ornamental purposes have given place to pulp mills, a large proportion of which treat the wood chemically, occasioning a shrinkage of over one-half the original solid contents. I except ground wood, of course. This condition has come about through a most natural process. The value of our forests as a source of lumber has been less than as a source of paper stock, while stream conservation and effect on climate, and all that goes with it, have been given little consideration.

Undoubtedly there is already, or can easily be produced, a sufficient quantity of unappropriated material suitable for the bulk of the needs of this industry.

As the value of the forest increases, there will be some lessening of the consumption of wood, and a gradual appropriation of other sources of raw material until it has reached its normal equilibrium. To this end, greater diligence will be exercised by those mills relying upon wood, in adapting their conditions and processes to the most economic results.

Manufacturers who are making a class of papers to which wood is normally adapted, as news and under certain conditions wrapping, will not pass through the ordeal which those will who have misapplied wood to the manufacture of higher grades, but still very inferior for the uses designed. These, in the nature of things, will have to contend with the increasing cost of wood, the growing revulsion of the pub-

lic against paper of such quality, and the competition of new sources of raw material which will satisfy these conditions better.

The art of paper making lies along two lines, including both mechanical and chemical details: raw materials for coarse products and fine products. A coarse raw material may be given a thorough, exhaustive treatment to make the highest grade product possible. In so doing there will be a consequent large shrinkage in yield and economic waste, and at a high cost; or the same material may be given a slight and inexpensive treatment to adapt it to a coarse product, which by nature it is best suited for. The product in this case will not be so high priced, but the cost and shrinkage will be low and the yield correspondingly large. The value of any raw material should not be dissipated through failure to make the most appropriate use of it.

Closely allied to the lack of such discriminating judgment in determining raw materials and products therefrom, is the failure to get the most out of the process. The sulphite process is often misapplied in the making of wrapping paper, and often badly managed in the yield of pulp. For such papers, only a sufficient softening treatment is necessary to make the stock pliable and workable, thus preserving strength and yield. This is practically illustrated in the process of boiling with water and weak chemicals for leather board and kraft paper.

If the cornstalk should ever come to be used for making a medium grade of white paper, its use for such purpose would be misapplied. Its normal place, if it has any in the paper business, will be found in connection with other suitable material to make boxboard, wherein the bulk of its solid contents could be made available at a slight cost for reduction. Failure to recognize its true place will result as in the past. From a practical as well as an economic standpoint the attempt to make out of paper stock a sanitary milk bottle to be used only once is such a perversion that

nothing serious need be expected from it.

It is often the practise to reduce stock to one level base and build up specialties from this. The skilful paper maker will select his raw materials with a view to close adaptation, avoiding the double cost of reducing to a base and building up from it. It often happens that effects can be gotten in this way that would be impossible in any other. This is shown in the manufacture of many very attractive cover papers.

Raw materials should be selected and processed with discriminating care and judgment so that there shall be as little degradation from one product to another as possible. In this way economy of production and conservation of resources will be promoted. It is to the credit of the industry that we have in abundance the attractive gray news board, though its coming was purely accidental. If old news could be so treated as to be used over again for the same grade of paper how great would be the economic gain! This is done to some extent in the case of printed book papers.

In the manufacture of heavy papers and particularly boards for a great variety of uses, I do not believe the use of the cylinder machine has been applied to anything like the limit of its possibilities. With properly prepared stock for lining, this machine is capable of using very inferior grades of stock for the middle, and producing a product of great attractiveness and growing usefulness. Such a product has a great market before it in furnishing material for small packages for which wood has been used, but is becoming too costly.

Up to the present time there has been, in the main, only one object in view in treating raw materials, namely, the obtaining of paper stock; and I regret to say this work has been done largely by the use of drastic agents in a single operation. Henceforth more selective processes will be discovered, resulting in economy of chemicals, recovery of useful products and larger yield of paper stock.

In the field of raw materials there is line, on the one side of which paper stock has been largely developed at the expense of all else; on the other side there is now a small area where raw materials are treated for useful products only, but with an ultimate view to the making of paper stock; I refer to the extraction of waste pine wood for

turpentine and rosin and of chestnut wood for tannin. These latter will soon enter the field of paper making.

It is, therefore, of great importance that the whole industry should look into its raw materials and processes to see if there are not still many undiscovered sources of economy and productive wealth.

FEDERAL AID FOR TEACHING FORESTRY

By PROF. SAMUEL B. GREEN, University of Minnesota

IT IS the work of the real statesman to concentrate the enthusiasm of the present moment into the actuality of the thing done for the future. The enthusiasm of the moment cannot last. The present enthusiasm for forestry cannot be expected to continue for many years in its present vigorous form. This enthusiasm has been created largely by, and is largely responsible, also, for the creation of the present grand and effective work that is being done by the United States Forest Service. I would not for a moment belittle the value of the United States Forest Service, for, like the accomplished and devoted man at its head, it has for a number of years been a great source of inspiration to all engaged in forestry work. On the other hand, this federal work must be supplemented by a strong, well-grounded public interest, or it cannot accomplish the greatest good. This must be done in each state. In its last analysis forestry is largely a business, and must stand on a business basis. In comparatively few, if any, of the states has it reached this stage of development. Great reforms are most quickly made permanent and helpful by educating the young. There is no question but that we shall continue to educate lumbermen and others of mature years in forestry matters; but the foundation

of the forest wealth of the future should be found in the establishment of first-class forest schools, and we need at least one school of this kind in every state and territory in the Union. It is probably best that these schools should be connected with the agricultural colleges, since these institutions are well fitted for taking up a work of this kind. It seems to me that an especially fitting use of public funds is for the promotion of some line of endeavor making for the permanency of the state as a whole. That forestry and the conservation of natural resources represent such a work should be evident.

The request for a congressional appropriation for the teaching of forestry is not a raid upon the public treasury, but is an endeavor to insure the welfare of the future of this country, and is something that should commend itself to every statesman. My idea is that appropriations for an object of this kind should be so made as to encourage the states to do something for themselves. On this account, H. R. 9219, a bill now before Congress and known as the Davis Forestry Bill, provides that the appropriation of \$5,000 by the National Government for the support of forestry instruction and experimentation in the schools and colleges benefited thereby is conditioned upon the

appropriation of a like amount by each state that shall take advantage of its provisions, and the whole amount shall be expended subject to the approval of the Secretary of Agriculture. This would require a total appropriation from the National Government of perhaps \$250,000, a very small amount. This may be met by the statement that these agricultural colleges and experiment stations already receive something over \$700,000 per year from the National Government. To this I would reply that this expenditure has been well justified by the great benefit that has come to agriculture as a result of it. Some single discoveries have already been worth more to the country as a whole than the total of all the appropriations ever made for the agricultural colleges and experiment stations. This money could be used for forestry, but in almost every case it is largely used by, and needed for other lines of agriculture.

When we think of the enormous value of the forest output of this country, the amount requested to educate young men to be competent to take care of this forest wealth seems trivial indeed. I do not wish to see all the agricultural colleges attempting to turn out professional foresters, and such would not be the effect of these proposed expenditures; but the result would be that in a short time we would have a surplus of young men well trained in the basic principles of forestry, through whose efforts the forest sentiment of to-day would crystallize into a permanent and helpful thing.

I have been in my present position in the University of Minnesota nearly

twenty-one years. When I came here in the spring of 1888 there was not a student in the agricultural department; that department was maintained by the state simply for the purpose of getting the national appropriations for this subject, and the whole work was regarded with contempt by practically all the citizens of the state. We have to-day overcome this lack of interest. Last year we had enrolled in our school, college and short course in agriculture, without counting students in any of the other departments, and only those who are required to take the agricultural subjects, over 1,130 students. In that time this institution has grown from a position of inferiority to one of first importance in helpfulness to the people of the state; it is probably our most popular institution of any kind, and the easiest for which to secure appropriations. The state has permanently invested in lands and buildings for the carrying on of this educational work and this only, besides the general university work, a total of over \$700,000, a result which has come from the fact that we have not followed precedents established elsewhere but have tried to make our work as helpful as possible to the people of this state. That it has been found helpful is shown by the large number of young men and women who are doing much to bring about improved rural conditions. I am thoroughly convinced that, by the proper education of our young people in forestry, we could do as much for this subject as has been done for agriculture, and that in no other way can forestry be put upon the most helpful basis.



The Appalachian Forests

The fate of the Southern Appalachian and White Mountain forests, the watersheds of many of the most important rivers of the eastern United States, the sources of a great part of the remaining timber supply of this part of the country, hangs in the balance. Only the intervention of the United States government can save these great mountain watersheds from rapid denudation and keep them for future generations what they have been to the present and past generations

Reservoirs, Timber Farms, Sanitaria and Recreation Places

This is the concern of many states—not of one or two. The task of protection and maintenance is too great for one or two; it is a national job, like reclamation, the Panama Canal, or the improvement of the waterways for the permanence and usefulness of which these mountain forests are necessary.

THE WEEKS BILL

for the acquisition of national forests is a measure of national scope, but in it lies the hope of the Southern Appalachians and White Mountains, the most immediately necessary and definite opportunity for conservation of natural resources now before the American people.

This bill passed the House of Representatives of the Sixtieth Congress by a vote of 157 to 147. It failed for lack of time in the Senate. It is now before the Committee on Agriculture of the House.

There is good reason to believe that it will soon be reported and come before the House for action.

How does your Representative stand on this question?

The small majority of 1909 should be increased.

Now is the time to use your influence as a citizen for this measure, a measure of McKinley, of Roosevelt, of Taft, of the people—millions of them.

If you do not know how the Representatives of your state voted send to the American Forestry Association at once for **Bulletin No. 2.**

If you want a stirring argument and a brief for the bill, send for **Bulletin No. 1.**

If you want a copy of the Weeks Bill send for **Bulletin No. 3.**

If you can use more than one copy of these bulletins, ask for them. They were printed to do good, and there is an abundant supply.

In any case do something

Do not delay

**PUBLIC OPINION IS THE LEVER THAT
MOVES CONGRESS**

EDITORIAL

What the Weeks Bill Is

WE HAVE been asked to give a brief outline of the provisions of the so-called Weeks Bill, embodying the present form of the Southern Appalachian-White Mountain National Forest project. The full text of the bill was published recently in this magazine, and has been issued as bulletin No. 3 in the general series of the American Forestry Association. In the latter form, single copies can be obtained by application to the office of the Association, and they can also be obtained in large numbers for distribution. Many people, however, desire an explanation of the bill stripped of the verbiage of its legislative form.

In the first place, it gives the consent of Congress to the states of the Union to enter into compacts to conserve their forests and water supply, and it appropriates \$200,000 to be used by the Secretary of Agriculture to assist any state or group of states when requested to do so in protecting from fire the forested watersheds of navigable streams. Such assistance cannot be given unless the state has itself provided for a system of forest-fire protection and the amount expended in any state in any year may not exceed that appropriated by the state. The Secretary of Agriculture may also agree to administer and protect for a term of years private forest lands situated on watersheds whereon there are national forest lands, and in such cases the owner of these private lands can cut and remove timber only under such regulations as will protect the forest in the aid of navigation.

For the fiscal year ending June 30, 1910, the sum of \$1,000,000, and for each year thereafter until June 30, 1915, the sum of \$2,000,000 is appropriated

for the examination, survey, and acquirement of land on the headwaters of navigable streams, or those which are being or may be developed for navigable purposes. This expenditure is to be made by a commission consisting of the Secretaries of War, of the Interior, and of Agriculture, two senators, and two representatives, which commission is to report annually to Congress. The Secretary of Agriculture is to examine, locate, and recommend for purchase lands which may be necessary to regulate the flow of navigable streams and report to the commission, but before any purchase is made the Geological Survey must have made a report to the Secretary of Agriculture showing that the control of such lands will promote or protect the navigation of streams on whose watersheds they lie. Prices of lands purchased are to be fixed by the commission, and the consent of the state in which the land lies must have been given to the acquisition of such lands by the United States. Mineral and merchantable timber rights are to be reserved to the owners, but the timber can only be removed under rules and regulations expressed in the instrument of conveyance. Agricultural land included in the takings may be set apart and sold as homesteads in tracts not exceeding eighty acres under rules prescribed by the Secretaries of Agriculture and the Interior.

The lands so secured are to be held and administered as national forest lands; civil and criminal jurisdiction is not affected by such administration except so far as offenses against the United States are concerned; and five per cent of all income from such national forest shall be paid to the state in which it is located to be expended for public schools and public roads in the counties in which the forest is sit-

vated. An annual appropriation, not exceeding \$25,000, is made for the expenses of the commission and its members.

These are the provisions of the act in outline. It will be noticed that it nowhere mentions any specific localities in which such forests are to be acquired. It is, therefore, an act of general, national application and its special application to the two Appalachian areas is simply due to the fact that they are known to be the most important forest regions in the East for the purposes of this act. It is believed by many of the best friends of the Southern Appalachian and White Mountains that a broad, national measure of this kind is better than one that is specific, and this is certainly true as far as general principles of legislation are concerned. As originally introduced in the Sixtieth Congress, and as it passed the House in that Congress, the Weeks Bill had a duration of nine years instead of five. We believe that it was better in that form and that a period of time as long as nine years is needed to demonstrate in the most complete manner the need and value of these forests for national purposes. The change was probably made in order to facilitate the passage of the bill through Congress, and in the belief, which we hope is well founded, that within five years its usefulness would have been sufficiently demonstrated to establish the policy.

Whatever differences of opinion there may be upon special features of the bill, it must be remembered that it is the product of the careful study of some of the ablest men in the House of Representatives, and that they have also consulted with some of the senators who have been particularly interested in this measure, and that the bill is the form of legislation which they believe to be most practicable. It is, therefore, necessary that all friends of the great object towards which this bill is directed should put their shoulders to the wheel in the united effort to push it through to the long-sought goal.

The Report of Mr. Moore

THE translation from the *Revue des Eaux et Forêts* of Paris, which is published elsewhere in these pages, is of peculiar interest at this time because it reviews the work and conclusions of some of the French and German investigators who were cited mistakenly, we believe, to support some of the contentions of Mr. Willis L. Moore, the Chief of the Weather Bureau, in his recent report on the influence of forests on climate and on floods. It appears from this French review of the discussions of the Milan conference, as well as from the testimony of Professor Swain at the hearing before the Committee on Agriculture on the 25th of February, that the judgment of the foreign investigators is practically unanimous in opposition to the position taken by Mr. Moore and some of the army engineers. Next month we shall publish in AMERICAN FORESTRY a symposium by some of our best American authorities dealing with Mr. Moore's report.

The attention that has been given to this somewhat remarkable document is out of all proportion to its scientific value, but when a man who is known as the Chief of the United States Weather Bureau issues such a report upon a subject that is of vital interest to the whole country, and that bears upon many of its most important questions, the public as a whole is likely to estimate the statement by the position held by its author, without a close examination of his authority, his qualifications to judge of the subject in hand, or the scientific accuracy of his reasoning. On these points it may be said that whatever position may be accorded the Chief of the Weather Bureau as a meteorologist, he has not qualified in any respect as a physiographer or as a forest engineer, and the men who have so qualified have a right to contradict his conclusions, as they almost unanimously do. Mr. Moore consciously and intentionally considers

the subject solely from the standpoint of his special field. Note this statement: "The run-off of our rivers is not materially affected by any other factor than the precipitation." To say this is to shut one's eyes to many factors which affect the run-off of rivers and which are known to every observer, even to those who are not trained in scientific methods of investigation.

But it is not our intention to discuss the details of Mr. Moore's report. We have made provision for doing that in the pages of this magazine by the most competent hands. We wish to say a word of the circumstances under which this report was made and the apparent animus behind it, both of which are of interest to the country as a whole, since the report has been very widely distributed, and have some bearing upon the estimate we may make of its value. We are told that "when Prof. Willis L. Moore was before the Committee on Agriculture of the House of Representatives in 1909, to explain the estimates for the Weather Bureau, a discussion arose as to the influence of forests on climate and on the run-off of water. Professor Moore stated that he was then making some studies on the subject which might lead to some definite conclusions, and he was requested by the chairman of the committee to continue these studies and make a report when they were concluded. This has been done, and the report submitted by Professor Moore, which follows, is printed by the direction of the committee." It is not explained what the relation of this discussion was to the question of estimates for the Weather Bureau, nor why Mr. Moore, a bureau chief in the Department of Agriculture, should be privileged to issue a special report of this kind bearing upon the work of other bureaus of his own department and of a coordinate government department, under authority of a congressional committee, and without the authorization of his chief, when other

chiefs of the bureaus of these departments were barred by executive order from discussing his conclusions or making any reply thereto. In a speech by Hon. Charles F. Scott, chairman of the Committee on Agriculture, delivered at the Boston City Club about a year ago, Mr. Scott spoke of Mr. Moore as "one who could sing the birds out of the trees," and intimated that when Mr. Moore appeared before his (Mr. Scott's) committee to ask for anything, he generally got pretty nearly what he asked for. Does this remarkable statement have any bearing upon the fact that at a time when other bureau chiefs are kept in leash by executive authority, Mr. Moore is permitted to issue a report upon a general question and to introduce into that report the remarkable series of italicized clauses which apparently are directed at certain legislation to which the chairman of the Committee on Agriculture has shown most determined hostility? It is well known that Mr. Moore's conclusions are not those of the best authorities on the subject in the Forest Service or in the Geological Survey, yet they must keep silence while Mr. Moore's report is sent broadcast under frank and every available mailing list is utilized to give it the widest possible circulation.

There is neither honesty nor fair play in this method of procedure, and in view of the fact that the recognized authorities in the Government service cannot talk, we propose through this magazine and through the bulletins of the American Forestry Association to spread as widely as Mr. Moore's report has been spread the opinions of the best authorities on this question whom we have in this country. In doing this we believe that we shall simply be performing the public duty which the American Forestry Association and this magazine owe to the people. All that we ask for is a fair discussion and an open forum. Mr. Moore has attempted to speak his piece in a closed forum. We propose to throw the doors wide open.

The Lesson of Canada

AT ONE of the sessions of the Canadian Forestry Association held last week at Fredericton, New Brunswick, the chairman of the Canadian Conservation Commission, Hon. Clifford Sifton, made an address of much interest to us on this side of the line. We are accustomed to think of Canada as a country of big woods and inexhaustible timber supply, looking at it in much the same careless fashion that we have been wont to regard our own conditions until we were aroused, most of us, to the actual situation. Not long ago a German forest expert was sent to Canada to report on conditions there, and his report was to the effect that other countries could not look to Canada for their timber supply, that our northern neighbor needed all of her own product for her own uses, and was coming to realize it. This German report was cited at length by the British Royal Commission on Afforestation, in its able and instructive report recommending the reforestation of 9,000,000 acres of land in England, and providing a detailed plan for financing and carrying out this work through a series of years, in order that England might produce its own timber and become independent of foreign countries.

In the address referred to, Mr. Sifton called attention to the fact that the United States cannot supply itself with wood for more than thirty years, and declared that "should it become necessary for the United States to look to Canada for a further supply of wood, all the merchantable lumber in Canada's forests would be exhausted at the end of seven years." We quote from the press report. Mr. Sifton expressed the opinion that within the present generation it would be necessary to place legal limitations upon the quantity of lumber to be cut, and he believed in making a beginning of that policy at once. Ontario already compels all timber cut on government lands to be manufactured

in the province. This policy has brought into Canada from Michigan many mills that formerly manufactured Ontario timber in that state. Quebec proposes to adopt a similar policy, and Mr. Sifton urged it upon the consideration of New Brunswick. He did not believe it to be wise for the government to dispose of the fee in its timber lands. When so disposed of they became subject to taxation by the state, which to obtain as large a revenue as possible fixed a high rate which encouraged lumbermen to cut the timber as rapidly as possible. The Dominion policy is to lease land on renewal terms and to continue the leases as long as the lessees live up to the terms of the leases.

Mr. Sifton urged the association to favor the establishment of forest reserves on the eastern slopes of the Rocky Mountains, because unless something were done to preserve the forests there the country would be flooded at one season of the year and become a barren waste at another. Evidently, the distinguished Canadian had not heard from the United States Weather Bureau.

The moral of all this is that, like all the rest of the civilized world, Canada is measuring her timber resources and preparing to protect them by progressive and drastic measures against exploitation for the benefit of wasteful foreign countries, including her next-door neighbor. We cannot look to the north for our salvation. We must husband all our remaining resources and plant trees wherever they can be grown more profitably than other crops, in order that our own future may be assured. That is the only way. Canada has not the resources for her own needs and ours too, and she is sufficiently wide awake and intelligent to guard her own. The only way that our timber resources and Canada's can be made inexhaustible is by the application of the highest scientific knowledge and the broadest common sense.

THE NATIONAL FORESTS

National Forests and Stream Protection*

By F. A. FENN

Supervisor, United States Forest Service

"Forest conservation" is a broad term, comprehending far more than mere "timber preservation," which is often mistakenly regarded as an equivalent expression. It is true that we cannot preserve our timber so as to have a continuous supply of timber products without conserving our forests; but it is also true that without conserving the forests we cannot maintain an equable flow in our streams for the steady generation of a maximum of power; for the realization of the greatest benefit in irrigation, and for the highest utilization of our rivers for purposes of trade and commerce, matters of supreme public importance that may be vitally affected by forests which contain little or no timber of merchantable character. Our national forests, the so-called forest reserves, are established for the conservation of all the potential forest resources, not for the preservation of timber only. No fact is better established than that the forests provided by Nature as a protective cover for the water-sheds of rivers are the best possible regulator of stream-flow. Maintain that cover and the rivers will be most efficient in the discharge of those functions so beneficial to mankind; destroy it and they become relatively inefficient or positively injurious and destructive because of erratic flow. As an example, I need only refer to the Ohio River, where, in consequence of the denudation of its drainage basin, the navigability of the stream has been greatly impaired and the destruction of property by freshets and floods now annually reaches millions of dollars.

The Inland Empire has for nearly a half-century hoped for an all-water route to the sea. Thanks largely to the efforts of your people here, that hope is at last practically realized, and the Snake River from Lewiston to the Columbia is an important part of that route. Have you considered the fact that the total amount of water appropriated for irrigation purposes from the Snake River and its tributaries above Huntington, Oreg., exceeds the mean low-water flow of the river at Huntington Bridge? Within a very few years, when the great reclamation schemes of South Idaho now in course of development shall have been put in full operation, unless some system different from what is now

outlined be adopted regarding the waters of that great stream, the Snake River at Huntington will cease to deserve the name; its bed will be practically dry for a good part of every season, its waters diverted to subject the desert to the beneficial use of man. We wish our neighbors of the South the fullest measure of success, prosperity, and happiness, but we must remember that what they are doing directly and injuriously affects the navigability of the Snake River below Lewiston. We cannot complain at that, but it compels us to be the more careful in conserving the supply of water for navigation that is available from other sources. Below Huntington every considerable affluent of the Snake has its headwaters protected from denudation and injurious use by the national government through the establishment of national forests. The most important of these tributary streams are the Salmon and Clearwater rivers, whose vast drainage basins nature has clothed with magnificent sylvical growth. Properly managed, conservatively handled, the forests there will produce enormous quantities of timber indefinitely and at the same time perform the many other functions to which they are so admirably adapted, and chief among which is the maintenance of a stable, uniform stream-flow. On the contrary, if they be abused or neglected, if they be exposed to uncontrolled, unregulated use by those who look for quick profits and personal aggrandizement rather than ultimate good and public benefit, the forests will be devastated, the timber supply will quickly be exhausted, the flow of the rivers will become irregular and uncertain, their capacity to generate a steady amount of power for the multitudinous uses of the people will be impaired, your labors in the cause of Snake River navigation will be rendered vain, and the all-water route from Lewiston to the sea will be but the memory of a dream. Much as it is to be desired that every branch of industry should be established and made to prosper in this city, it would be a shortsighted policy that would encourage the exploitation of the forests upon which reliance must be had for a navigable stage of water in the Snake River from here to the Columbia for the longest possible time every year. Do not allow the prospect of a great temporary lumber industry at this point or elsewhere in this section to blind you to the incalculable permanent good to the whole community that

*This article is the substance of an address delivered by Major Fenn May 19, 1909, in Lewiston, Idaho.

will result from a careful, systematic conservation of the forest resources of the empire drained by the great rivers at whose confluence you are situated; better, far better, that many small lumbering plants should be operated all over the interior country under regulations that will assure the conservative use of timber products, avoid monopoly, guard against waste, and prevent the destruction of forest conditions upon which more than upon any possible exclusive timber business the continued growth and prosperity of Lewiston and her tributary territory depend.

Conserve the forest resources, guard them jealously, keep your rivers open and in the highest state of utility for purposes of trade and commerce, hold them as great public highways. Above all, insist upon it that the forest conditions favorable to the maintenance in these streams of a stage of water suitable to unimpeded navigation shall be preserved and continued, and Lewiston will attain to the proud position among the cities of the West for which her natural location and surroundings so eminently fit her; and, at the same time, the entire interior will benefit by what you do and reciprocally enhance your prestige and material prosperity.



The National Forest Boundaries

As a result of the examination last summer of national-forest boundaries much land not suited to forest purposes, along the edge of and within national forests will be restored to the unreserved public domain, in accordance with a plan submitted to the President by the Secretaries of Agriculture and of the Interior. Maps and reports now in the possession of the Department of Agriculture show the nature of the lands and cover along the national-forest boundaries and within the forests. This information was secured in order to rectify the boundaries, since it was never intended that the national forests should include agricultural lands, or grazing lands not suitable for forest purposes. To obtain it involved going over about 60,000 miles of boundaries. The report to the President follows:

February 7, 1910.

THE PRESIDENT, *The White House*.

SIR: After having very carefully considered the matter of eliminations from the additions to the national forests, we respectfully recommend that the following general policy be adopted:

1. Lands wholly or in part covered with brush or other undergrowth which protects stream-flow or checks erosion on the watershed of any stream important to irrigation or to the water supply of any city, town, or community, or open lands on which trees may be grown, should be retained within the national forests, unless their permanent value under cultivation is greater than their value as a protective forest.

2. Lands wholly or in part covered with timber or undergrowth, or cut-over lands which are more valuable for the production of trees than for agricultural crops, and lands densely stocked with young trees having a prospective value greater than the value of the land for agricultural purposes, should be retained within the national forests.

3. Lands not either wholly or in part covered with timber or undergrowth, which are located above timber line within the forest boundary or in small bodies scattered through the forest, making elimination impracticable, or limited areas which are necessarily included for a proper administrative boundary line, should be retained within the national forests.

4. Lands not either wholly or in part covered with timber or undergrowth, except as provided for in the preceding paragraphs, upon which it is not expected to grow trees, should be eliminated from the national forests.

We have the honor to be, very respectfully,

Your obedient servants,

(Signed) JAMES WILSON,

Secretary of Agriculture.

(Signed) R. A. BALLINGER,

Secretary of the Interior.

On the whole, the changes which are found to be called for are of relatively minor importance, but in their aggregate they open to settlement a large amount of land. The application of the rules which the President has approved will mean the early restoration to the public domain of 4,000,000 acres or more of national-forest land. This is something over two per cent of the total national-forest area. Three-tenths of the forests have yet to be mapped.

Some of the land is suitable for dry-land agriculture, though the greater part is grazing land. In Idaho, which has a large national-forest area, about 470,000 acres will be eliminated, of which thirty-four per cent is tillable. Eliminations in similar proportion will be made in a number of the other western states which have large amounts of land in national forests.

STATE WORK

Kentucky

A bill has been introduced in the legislature the provisions of which are thus summarized by the *Louisville Courier-Journal*:

"A board of forestry shall consist of the governor, the director of the Kentucky Experiment Station at Lexington as *ex-officio* members; the state forester, a trained man appointed by the governor, with the advice of the senate, and four members similarly appointed.

"The forestry board shall have the care and control of state reserves hereafter to be acquired, shall ascertain the best methods of reforestation cut-over lands, foresting waste lands, preventing destruction of forests by fire, administering forests upon scientific principles, instructing private owners in practical forestry, and conserving timber on the watersheds of streams.

"The board shall be allowed to purchase reserves at a price not above \$5 an acre, to receive gifts of land and money for forestry purposes and as a breeding place for game.

"The board shall secure and publish in popular form information as to the best methods as to conserving the forest and water supply.

"The state forester shall, when directed, cooperate with counties, corporations, municipalities, and individuals in conservation work.

"The salary of the state forester is fixed at a maximum of \$2,000 a year and reasonable traveling expenses."



Louisiana

John H. Foster, forest assistant of the United States Forest Service, is making an examination, with Register Grace, of the state land office, of the Louisiana forests, for the purpose of preparing a report to the general assembly looking to their maintenance. Mr. Grace has collected much data through the assessors, and a thorough personal survey of the state will also be made. Considerable attention is to be given to the denuded pine lands.

At its annual meeting in January the Louisiana Forestry Association elected the following officers: President, Henry E. Hardtner of Urania; vice-presidents, W. O. Hart of New Orleans, E. A. Frost of Shreveport, T. C. Wingate of Leesville; secretary, Mrs. A. B. Avery of Shreveport; treasurer, Robert Roberts, Jr., of Minden; councillors

at large, Mrs. J. D. Wilkinson, Shreveport; Harry P. Gamble, Winnfield; M. O. Lambly, Jennings; executive council, Charles P. Johnston, New Orleans, first congressional district; Grace King, New Orleans, second congressional district; Professor Alleman, Baton Rouge, third congressional district; Thomas J. Davis, Leesville, fourth congressional district; J. W. Elder, Farmerville, fifth congressional district; Fred J. Grace, Baton Rouge, sixth congressional district; H. H. White, Alexandria, seventh congressional district.

The following resolution was adopted: "*Be it resolved* by the Louisiana Forestry Association, in regular meeting assembled, that the general assembly of the state of Louisiana is hereby urged and requested to appropriate sufficient funds to maintain the chair of forestry at the Louisiana State University created by an act of the general assembly."



Maryland

The report of F. W. Besley, state forester of Maryland, to the governor, states that in the last three years the work of making a forest survey of the state has been completed in eighteen of the twenty-three counties.

Forest conditions in eight counties—Somerset, Dorchester, Talbot, Caroline, Anne Arundel, Baltimore, Howard, and Montgomery—have been carefully studied, resulting in detailed forest maps showing location of all woodlands, character and conditions of growth, stand and value of timber, reliable data as to uses of timber and observations in bettering the methods of forest management.

The forest-warden system inaugurated three years ago has been improved and made more effective for the suppression of forest fires. During the last year thirty of the eighty-three fires reported were extinguished by the forest wardens at a total cost of \$367. The present forest protection system, as imperfect as it is with unpaid wardens, has accomplished an immense amount of good in making people more careful about fires and in suppressing before much damage is done those that occur.

"The rapid exhaustion of local timber resources," says Mr. Besley, "is a serious question. Other states are much in the same predicament. We must eventually depend on our own forests for most of our timber supply. Under present conditions, through wasteful and injudicious methods of cutting

and as a result of repeated forest fires, our woodlands are deteriorating so that they are producing but one-third or one-fourth of what they are capable of doing under proper and reasonable management.

"Since the woodlands are almost entirely in private lands, improvements must be effected by educating owners to the importance of improved methods of management to secure the greatest permanent revenue and to pass this valuable resource unimpaired to the next generation."

The state owns four forest reserves aggregating 1,957 acres, which have been placed under systematic forest management to serve as object lessons of what forestry is and what it may accomplish. These reserves under the care of the state board of forestry will in a few years pay the cost of maintenance and eventually pay a revenue to the state.



Maine

A Maine legislative commission is investigating the practicability of harnessing 530,000 horse-power in waterways under state control. This is probably the reason for Representative Guernsey's proposed modification of the Weeks Bill, permitting the states to enter national forests to establish and control water-powers therein.



Massachusetts

The grave menace which the imported gypsy and brown-tail moths have been and are to the trees and woods of Massachusetts, together with the danger that if not controlled they may become a national nuisance, attaches great interest to the work going on in the Bay State to assure this control. It is generally conceded that the ordinary physical means of fighting the spread of the pests are only emergency measures and too costly to be a permanent dependence. The ultimate hope of the regions now or likely to be infested is in the introduction of natural enemies that will keep the gypsy and brown-tail in check without themselves doing damage. Much work has been done along this line, under the direction of Dr. L. O. Howard, of the National Bureau of Entomology, cooperating with the Massachusetts forest service. Some interesting details of the work are given in a recent interview, in the *Boston Post*, with W. F. Fiske, the expert in charge of the state laboratory at Melrose Highlands, Mass. Mr. Fiske is an interesting talker on his subject, modest and unassuming; but an expert who knows his work.

There have been introduced into the United States some fifty sorts of parasites that prey upon the two destructive moths, and of these fully forty-five have been turned loose in

Massachusetts. They range from the tiny *Shedius*, a chalcid fly, which resembles a midge, or black fly, and which invades the egg of the gypsy moth, to the big black and green beetle, known as the *Calosoma* beetle, which eats the caterpillars alive. Between these extremes are such versatile parasites as the *Glyplanapanteles fulvipes*, a fly that attacks the caterpillar at all stages of development. For five years, now, these various natural enemies of the gypsy and brown-tail moths have been introduced into Massachusetts and the question raised has always been as to their efficiency in a new environment.

"What we intend to do this spring and summer," says Mr. Fiske, "is to find out just how great has been the increase in these parasites. We feel rather confident that this increase has been even larger than we counted upon at the beginning. For instance, in the case of the *Monodontomerus aereus*, which was introduced in 1906, we found a year ago last spring only twelve of these parasites to 1,000 brown-tail moth nests examined. Last spring we found 350 of these parasites to 1,000 nests. This estimate was based on examination of caterpillar nests in search for eggs of the parasites. We look for a proportionate increase in other destructive agents, but we know well enough that to find certain of the parasites, such as the tachid flies, is difficult. A great many persons interested in the work we are doing have said that they have not noticed the parasites, and the reason is simply that either the parasites keep out of sight or that some of them so closely resemble certain common insects that the average person does not mark the difference. The tachid flies look very much like common house flies at first glance."

"We have spent a great deal of time and money in propagating and distributing parasites, and now we are going to take stock, so to speak. Many persons think that when parasites are liberated in a certain district, they must of necessity clean that district of moths and caterpillars before they move on or increase in numbers so that they cover other districts. This idea is wrong, for there is no way of controlling the insects, and we find that sometimes they do their best work at a remarkably long distance from where they were distributed. Various elements may enter into these unexplainable immigrations, and the one reassuring fact is that in some cases they may forestall the moths in localities and be there to meet the pests when they arrive. In going over the ground this spring we shall be able to find out whether the parasites are doing what they were brought here to do, and if they are not we shall remedy conditions by bringing in other sorts with which, up to the present, we have scarcely done more than to experiment."

Regarding some of the more interesting destructive agents with which Mr. Fiske and his collaborators have been working, there is

much to be said for the big calosoma beetle. In appearance it is a hard-shelled insect, almost as large as a miller's thumb, and colored in iridescent hues, with green predominating, as in the so-called scarabs, or sacred Egyptian beetles. In speaking of the beetle, Mr. Fiske said:

"The chief objection to giving too much attention to this beetle has been the length of time it requires to propagate. The moth pest needed quick action, and the generation of the beetle is about three years. Nevertheless, they are known to live for several years, retiring before cold weather into cells they dig in the earth. The periods of activity of the adult beetles correspond in a general way to those of the gypsy moth, and they feed voraciously on the live caterpillars. They appear to seek out the places where the caterpillars are plentiful, and there they remain to feed on them. The eggs of these beetles are deposited in the earth near the base of trees infested by caterpillars, and as soon as the larvæ hatch they climb the tree in search of their prey. Even at this stage they are strong and active enough to attack the full-grown caterpillar of the gypsy moth. When the pupæ of the beetle are thus supplied with food they grow rapidly, molting twice before reentering the earth, where they undergo the subsequent transformations to pupæ and the adult form."

New York

In connection with the investigation in New York into the forest land purchases of the state, Commissioner James S. Whipple states that he estimates the amount spent by the state for this purpose at about \$3,500,000. His report recently presented to the legislature shows that the state's holdings of forest lands aggregated on January 1, 1,841,523 acres, which included 1,530,559 acres in the Adirondacks and 110,984 in the Catskills. The state entered upon the policy of purchasing forest lands in 1897, which was the first year of the administration of Gov. Frank S. Black. Governor Hughes has appointed as commissioners for the purpose of investigating the management and affairs of the state forest, fish and game commission, and the purchases of land made by the state within the forest preserve, Roger P. Clark, his legal adviser, and H. Leroy Austin, district attorney of Greene County. The investigation has the full approval of Commissioner Whipple. No specific charges have been filed, but since the Allds-Conger bribery scandal developed criticism has been directed against certain transaction in connection with the purchase of forest lands which the governor felt could no longer be ignored. The governor is greatly interested in the possibilities of the forest reserve and in the development of the water-powers of

the state and believes that the people have a right to know that their money, which goes to add to the forest reserve, is being honestly expended.

One of the largest spring water companies in New York State has been reforesting land for several years to protect its springs and maintain the purity and regular supply of water. In a letter to Commissioner Whipple of the forest, fish and game commission, it reports planting approximately 350,000 trees, consisting of Scotch pine, white pine, bull pine, red pine, larch (commonly called tamarack), arbor vitae or white cedar, balsam, and hemlock. This work covers an area of over 300 acres. A very large percentage of the trees has lived, the exceptions being those that were purchased in poor condition; but these exceptions do not apply to any state nursery trees, all the native product having been in uniformly good condition. Scotch pines set three years ago show a fine growth, many reaching a height of three feet. In some instances eighteen inches growth was added the past summer.

Through Commissioner Whipple's efforts 180 private parties planted 1,200,000 trees last year and practically every purchaser reports ninety per cent of the trees living.

Oregon

The Oregon state board of forestry plans an active educational campaign for the coming year. A report by the secretary of the board shows the number of forest fires in the state during 1909 to have been 413, burning over an area of 61,037 acres, classified as follows: "Merchantable timber, 33,137.5 acres; second growth and not yet merchantable, 5,607.5 acres; cut-over land, 22,202 acres. A total of 191,213,590 board feet of merchantable timber was destroyed in these fires. The timber destroyed represented a value of \$2,485,776.67 if it had been manufactured. During the year about \$45,000 was expended in fighting and preventing forest fires in the state. Of that amount, individuals and lumber companies contributed approximately \$40,000, the forest service spending only \$5,220.84 for this work.

"While Oregon had only 413 forest fires during the year, Washington had 1,309 fires," said Mr. Wastell. "At the same time, the state of Oregon sustained a loss of nearly 200,000,000 feet, board-measure, of standing timber, while Washington, with three times as many fires, only lost about 150,000,000 feet of standing timber.

"The hazard in Washington was greatly accentuated by reason of a very dry season and a large proportion of the fires were caused by sparks from locomotives. The cost of fighting fires, as paid by individuals, is as complete as it was possible to obtain. While the state of Washington assumed \$15,-

705 of the expense of fighting fires in that state, the state of Oregon spent no money in that direction.

"This study of comparisons is very interesting. The splendid showing in Washington, considering the large number of fires and the comparatively small amount of timber destroyed, is due to the organized effort of private timber owners through the medium of the Washington Forest-fire Association, as well as to the state and government, which participated so generously in this work.

"A few big fires in remote sections of

Oregon continued burning for weeks, covering a large area, while in Washington the fires were subdued promptly through having fire-fighting forces available. Oregon's lack of preparation would have resulted in a tremendous loss if a corresponding number of fires had started in this state."

The members of the state board of forestry are: Governor Benson, R. O. Stevenson, game and forestry warden; H. C. McAllister, master fish warden; S. C. Bartrum, of Roseburg; L. S. Hill, of Cottage Grove; Prof. E. R. Lake, of Corvallis, and A. B. Wastell, of Portland.

EDUCATION

Colorado School of Forestry

The Colorado School of Forestry was founded in 1905 by gifts from Dr. William A. Bell and from the late Gen. William J. Palmer. It is particularly fortunate in possessing a tract of 13,000 acres of forest land at Manitou Park, about twenty-five miles west of Colorado Springs near the line of the Colorado Midland Railroad. The forest on the school land consists mainly of western yellow pine and also of a small amount of Douglas fir. On account of the good market for forest products in the vicinity of Manitou Park, it is possible to practise very intensive methods of forestry. A sawmill is located on the school land at the present time to cut the over-mature and defective trees.

The faculty of the Colorado School of Forestry was increased this fall by the addition of two professors in forestry and lumbering who not only are graduates of the Yale Forest School, but have each had several years of administrative work in the Forest Service on the national forests in Colorado. The faculty has therefore for the instruction in forestry and lumbering both the advantages of complete technical training and of long experience in the actual practise of forestry. In addition to the two professors who teach forestry and lumbering, the faculty includes members of the faculty of Colorado College, of which institution the forestry school is a department. The regular course of the Colorado School of Forestry covers four years and leads to the degree of Forest Engineer.

The aim of the school is to give a thorough training to students who intend to adopt forestry as a profession and to fit them for positions in the government Forest Service, for positions as state foresters, or

for private employ as expert foresters. Although an undergraduate course does not give the student opportunity to make as complete study of the academic courses, the curriculum at the Colorado School of Forestry includes all the subjects in forestry and allied sciences necessary for thorough training of technical foresters. The Colorado school has the unique advantage of being located within easy reach of several national forests, and its students have therefore ample opportunity to inspect the most extensive work in practical forestry which can be found in the country. In addition to this great advantage, the location of the school in the West not only gives prospective foresters from the East who contemplate positions on the national forests opportunity during their college years to become familiar with western conditions of life, but also gives western young men opportunity to study forestry without undergoing the expense of a long journey to the East.

The total enrolment of the Colorado School of Forestry this fall was thirty. Of the seventeen members of the entering class, several are from Massachusetts, Pennsylvania, and other eastern states. The class of 1910, which will be the first to graduate, has four members.

The first lumbering trip has just been completed. The Seniors, with Prof. P. T. Coolidge, spent ten days early in December among the sawmills and logging camps near Fraser on the Arapaho National Forest. Fraser, a small town about eighty-five miles from Denver on the Moffat road, is the center of a considerable lumber industry, and is the headquarters of the Arapaho National Forest. This lumbering trip, which is to be an annual institution in the school, is part of the policy of teaching forestry and lumbering as much as possible in the lumber woods.

THE APPALACHIAN FOREST CAMPAIGN

The hearing on the Weeks bill, which is quite fully reported in other pages of this magazine, was continued on Tuesday and Wednesday, the 1st and 2d of March, in order to hear the testimony from Mr. Willis L. Moore, Chief of the Weather Bureau, and from some of the army engineers. The first witness at the Tuesday session was Major J. D. Cavanaugh, Assistant Chief of Engineers. Major Cavanaugh has had several years experience with rivers in Georgia and Alabama and testified with great fairness and moderation as to the opinions which he had formed from this experience. Major Cavanaugh was extremely frank in his statements and showed an entire lack of prejudice and a desire to be perfectly fair and to speak as a scientific and practical man rather than as a proponent of any theory. One of his most notable statements was to the effect that there is no question as to the protection of slopes by forests. "That," he said, "is one of the primary uses of forestry," and he cited France as a notable example.

Mr. Moore followed Major Cavanaugh. He recited his education and scientific training and experience and presented letters endorsing the position which he had taken in his recent report. Mr. Moore did not stand up well under the searching cross-examination of Representatives Lever and Plumley of the committee. Professor Swain was also present at the hearing and asked Mr. Moore some troublesome questions from the knowledge of a scientific expert. Mr. Moore acknowledged during the questioning that he was not a geologist, nor a forester, nor a hydrologist, admissions which weaken his authority on the subject dealt with in his report.

On the following day, Major W. H. Bixby, of the Corps of Engineers, and Capt. E. N. Johnson, of the same corps, testified. Major Bixby, an able officer and engineer, spoke mainly of his experience with the Mississippi and Missouri rivers, and his position was that which has become well known through the discussions by Colonel Chittenden and others as the position of the majority of members of the Engineer Corps. Colonel Bixby did not, however, apply his reasoning or his facts directly to the conditions in the Appalachian Mountains, his argument continually going back to the conditions which are peculiar to the Missouri and Mississippi.

Captain Johnson disclaimed any intention of advancing opinions or statements of his own, but appeared to lay before the committee certain reports and documents which were in the hands of the Corps of Engineers, his purpose being apparently quite as much to defend the engineer corps from charges of unwise expenditure of the public funds as to present any points in regard to the Weeks Bill or any other legislation. His statements were clear and well put, and he presented a strong case for the achievements of his corps. He was the last witness to appear before the committee. It was made clear that as regards navigation the army engineers generally pin their faith to work on the channels of streams and to bank protection, and have little faith in forestry; but on their own admissions the case as regards forest protection is still an open one, on which the authorities are divided.

It is improbable that any votes in the committee were influenced by the hearings, but it is understood that some members of the committee agree with the position taken by Mr. Weeks, that this bill really belongs to the House, and will vote to report it regardless of their personal views and the action they may take individually on the floor of the House.



A Clear Cut Resolution

The following strong resolution was adopted by the American Civic Association at its Cincinnati meeting, November 16:

"We reiterate our demand upon Congress for the establishment of National Forest Reserves in the northern and southern Appalachian regions, believing that this is a national issue, beyond the effective jurisdiction of any state or group of states, and vital to the welfare of almost the entire eastern half of the United States, and that every year's delay in their establishment adds mightily to the penalty of indifference that the Nation must pay."

This association, with its national scope and interests, representing the best public spirit of the country, has steadfastly supported the Appalachian National Forests project. The case has never been presented in the same number of words better than in this resolution.

NEWS AND NOTES

The Weyerhaeuser Idea as to Reforestation

"We believe that the only way in which the forests are likely to be replaced is for the state either to buy the lands from the lumber companies at a small price and replant the cut-over areas or remit the taxes. It is a simple mathematical demonstration that it will not pay the lumber corporations to keep up tax payments and wait for a new crop of trees on cut-over lands. When the taxes are added and the value of the timber is computed, it is only a two per cent investment and business men are not looking for that kind."

George S. Long, western representative of the Weyerhaeuser Lumber Company, which owns more than 3,000,000 acres of timber land in Washington, Oregon, and Idaho, made the foregoing reply in an interview when asked if the syndicate is making any effort to reforest cut-over land, and if it objected to paying taxes on the latter.



A Municipal Forest

The city of Vallejo may soon become the pioneer in municipal forestry in California. It will be if the city council acts favorably upon a recommendation made by the Merchants' Association of that city.

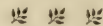
Vallejo owns its own water supply, and several thousand acres of land in Wild Horse Valley, the source of the water supply. This land is now practically worthless, and produces no revenue for the city. The Merchants' Association has proposed to the city council that the city plant 500 acres of this land to eucalyptus trees. The association figures that in ten years the city will have 250,000 matured trees, which, at a value of \$5 each, will be worth \$1,250,000. Thus in a few years this tract of land would be a permanent source of revenue and would reduce taxes to a minimum, perhaps doing away with city taxes completely.—*Times*, Visalia, Cal.



Fighting Forest Fires

Sometimes they do things very well in Michigan. As every one is aware, Michigan, like New Hampshire, is very solicitous for her forests. Again, like New Hampshire, Michigan is disturbed from time to time by forest fires, and every loyal Michigander is expected to prove his willingness, whenever occasion may demand, to join his neigh-

bors in fighting those fires. In fact, a Michigan statute specifically provides punishment for refusal to assist in suppressing a forest fire. Never, however, until last week has it been found necessary to invoke this statute, and then a man was sentenced to ninety days in the Detroit house of correction. * * * It is always to be expected that careful judgment will be exercised in the enforcement of this law, as of any other; and reasonableness in the application of this law, as well as public spirit on the part of the men of Michigan, is implied in the statement that no person had ever before been punished for refusal to fight forest fire in that state.—*Manchester (N. H.) Union*.



Drop in Lumber Output

According to the report of the Census Bureau on lumber, lath, and shingles, there was a heavy decrease in the cut and value of those articles for 1908 over the previous year. The value for 1907 is placed at \$897,941,736, while for 1908 the value is placed at \$698,262,175, a decrease of about \$200,000,000.

The smaller production was due to the business depression and to the decrease in the acreage of marketable logs. The average price of lumber from the mills is reported by this bulletin to have been \$15.37, as compared with \$16.56 for 1907.

There was an increase of 2,381 mills and a decrease of over 7,000,000,000 feet in the output for the year.

The state of Washington is still in the lead in the production of lumber, the bulk of its cut being from the Douglas fir. Louisiana is a close second, its output coming from yellow pine and cypress. Mississippi ranked third and Arkansas came fourth. The bulletin gives Michigan first place for the total cut of lumber since saw mills were set up first. The Wolverine state has about 100,000,000,000 feet of lumber to its credit. Wisconsin comes second with about 75,000,000,000 feet.—*Washington Times*.



A Forestry Course

A new four-year course in forestry has been added to the courses given in the College of Agriculture of the Ohio State University. There is an enrolment of twenty-eight students. Of this number eleven are freshmen and seventeen transfers from other courses.

Trees and Railroads

The suggestion that railroads plant rows of trees on either side of their tracks does not appeal to the *Cincinnati Times-Star*, which sees in such a plan a serious obstruction to the view of passengers, and added opportunity for collisions. It says:

"The conservation of the natural resources of this country in general, and reforestation in particular, are matters of the greatest importance and interest to every American who has his eye open to the needs of his country. But this idea of planting trees alongside of railroad tracks is more impressive on first suggestion than after it has been thought over a little."



Effect of Oxygen in Coal

Recent investigations by the United States Geological Survey have shown that oxygen, so essential to all life, forms in coal an impurity that is almost as injurious as the ash content. The subject is, of course, of great importance to the consumer, whether he be a manufacturer using hundreds of tons or a householder who has to supply only a furnace.

David White, an account of whose investigations on the subject has just been published by the Geological Survey as Bulletin 382, was led to these conclusions in the course of work undertaken in an attempt to devise an acceptable classification of the many different sorts of coals. He states that oxygen and ash are of very nearly equal negative value, ash being probably a little more injurious in most coals; and that the calorific value of coals in general is indicated by the balance between the total carbon on the one hand and the sum of the two great impurities, oxygen and ash, on the other. The practical application of these statements appears in considering the effect of the exposure of coal to the weather. The weathering of the lower grades, especially lignites, bituminous coals, and peats, is marked by the accession of oxygen, which is taken into combination. This increase of the oxygen content permits a calorific deficiency, which, on account of the high anticalorific value of oxygen, is often serious. It is possible that in many cases considerable increase of oxygen and consequent loss of efficiency are suffered by the lower-class fuels between removal from the bed and consumption; and it is probable that in the subbituminous coals, and more especially in the lignites, oxygenation begins immediately after the coal is blasted from the face in the mine.

Bulletin 382 can be had free of charge from the Director, United States Geological Survey, Washington, D. C.

New York Constructing a Waterway

The Troy, N. Y., *Times* says:

"The attention of the United States Government is called to the fact that the state of New York is constructing, at its own expense, a waterway from the Great Lakes to tidewater. This canal will accommodate vessels of larger size than any similar waterway this side of the Canadian border, and Uncle Sam can do a graceful act by providing proper facilities for traffic by properly dredging out the river from Waterford down to Hudson."



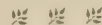
The Canal Requires Inland Waterways

In an address at Topeka, Kans., Mr. John Barrett, of the Bureau of American Republics, said: "It will be folly to spend \$4,000,000 on the Isthmian Canal and not a similar amount during the corresponding years in legitimate dredging and improving of the channels of the Mississippi, Missouri, and their navigable tributaries.

"Let Missouri, Kansas, and their neighboring states, as great industrial and agricultural productive districts, destined to supply the markets of the Pacific as well as those of the United States, support enthusiastically an agitation, a campaign of education of the people and Congress, which will make our country a leader and not a laggard in the competition for the vast prizes of international commerce upon the Pacific seas.

"The Panama project will be merely a dream if our Government does not improve our inland waterways and make them channels of cheap transportation to the seaboard."

The *Capital* adds: "For generations Congress may have frittered away millions in desultory and unsystematic river and harbor work, but the new idea of systematic waterway development appeals to the imagination of the country, especially of the West, as no national project that has been proposed in fifty years. It is a project worthy of the immense wealth and energies of the country, a big project, and a big country to carry it out. Mr. Barrett's appeal for it will not fall on deaf ears in this part of the country."



Artesian Possibilities in Antelope Valley

A brief advance statement of the artesian possibilities of a portion of the Antelope valley region, California, has been prepared by the United States Geological Survey in response to special requests. The conclusions resulting from the survey's investigation of the region are not favorable to the finding of extensive supplies of underground water. The area embraced in the report is T. 5 N., R. 8 W.; T. 5 N., R. 9 W.; T. 6 N., R. 8 W., and T. 6 N., R. 9 W.

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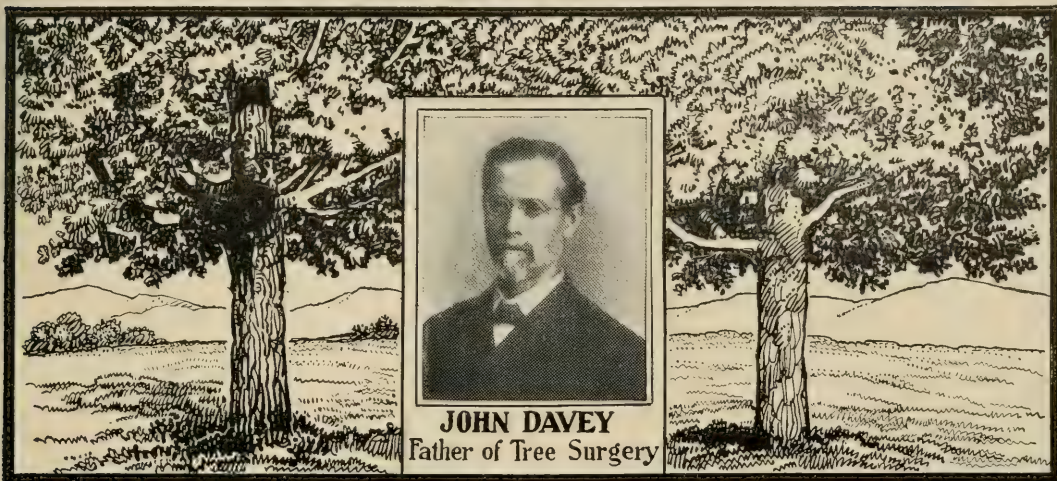
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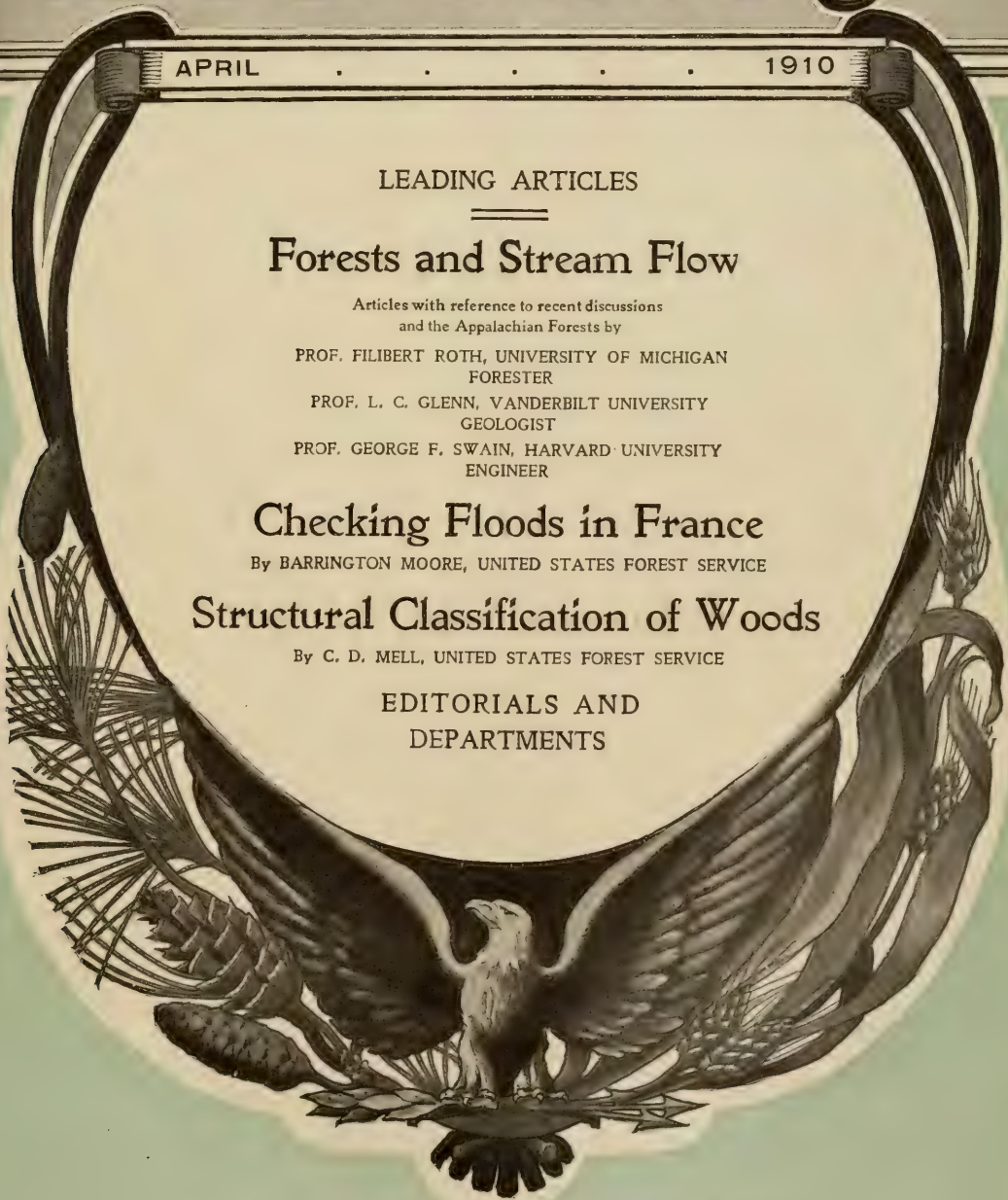
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1410 H Street N. W., Washington, D. C.

Dear Sir: I hereby signify my desire to become a member of the American Forestry Association. One dollar (\$1.00) for annual dues is enclosed herewith.

Very truly yours,

Name _____

P. O. Address _____



Keene Valley in the Adirondacks (see page 207)

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CHECKING FLOODS IN THE FRENCH ALPS

By BARRINGTON MOORE, M.F., United States Forest Service

I

DOUBTLESS we all have seen accounts of terrible losses and suffering caused by floods in France, not only in Paris but throughout the whole country. We must also have seen in all the papers and periodicals, particularly in *Collier's*, that the conservation policy so splendidly started by Gifford Pinchot and so ably backed by Theodore Roosevelt, which from its very beginning has from time to time been attacked by all the large interests, is now undergoing the fiercest test to which it has ever been subjected.

The connection between the two occurrences may not at once be apparent to the man who reads as he runs. But to those who have given the matter more than a passing thought there is a vitally important lesson to be learned.

The lesson is that if France had had a conservation policy a good many years ago, the damage caused by the recent floods would have been greatly lessened. It cannot be asserted that the flood which inundated Paris was due entirely or even chiefly to deforestation, since in the case of Paris so many different factors, such as the situation of the city immediately in the river bed and the particularly porous nature of the rock and soil comprising that part of France drained by the Seine, must be taken into consideration. But at the same time it cannot be denied that

equally destructive floods did occur and often have occurred before in less conspicuous parts of the country, and that these floods were largely if not entirely, due to the effects of deforestation.

It is therefore no exaggeration to say that if the people of the United States allow their present attempts to establish a conservation policy to be blocked by the big interests, large areas of our country will be subjected to the same dangers.

Hence a short account of the damage caused by these floods in the French Alps and of the costly work which is being done to prevent the future occurrence of this damage may be of some assistance in forming an opinion as to the importance of the conservation movement in the United States.

II. HISTORICAL

Before the French Revolution the mountains of France (chiefly the Alps in southeastern France) were well covered with forests which belonged to the crown and to the nobility. When the king and his courtiers were swept away by the rising tide of revolution, their possessions were swept with them into the all devouring maw of the communes and private individuals. The result was the wholesale destruction of the forests, as might have been ex-



CHECKING FLOODS IN THE FRENCH ALPS

Holding the slopes by strips of willow and grass after completion of engineering work. The barges in the stream channel have become so covered with loose rock as to be inconspicuous

pected when an extremely paternalistic form of government is succeeded by an extremely *laissez-faire* or individualistic form. It may be noticed in passing that this extreme *laissez-faire* policy has persisted to the present day not only in France but more particularly in the United States. And it has been only within the last few years that the people of this country have begun to realize that, although the policy of giving the individual a free hand and encouraging

him in every possible way is essential to the development of a new country, yet when that country is once pretty well built up, there are certain limits beyond which the individual should not be allowed to go without a certain small measure of restraint.

In France a considerable period elapsed before the effects of this deforestation was felt. But gradually a realization of the extent of the damage from which the people were suffering was brought home to them. Certain rivers which formed important arteries of commerce were being silted up and were thus choking the commerce dependent upon them, and many prosperous little villages in the mountains were threatened with destruction by over-hanging masses of earth and rock. In many cases small streams from these mountains had become intermittent raging torrents carrying down enormous boulders and masses of debris to overwhelm the prosperous communities in the valley, causing not infrequent losses of human life.

By 1882 public sentiment had become so strong that a bill was passed

authorizing work to be carried on to prevent these floods, and appropriating \$600,000 annually for this purpose. Thus in addition to the incalculable damage already suffered a heavy expense was to be incurred, for it must be remembered that this annual expense would inevitably extend over a considerable period of years. Already at least \$17,000,000 have been spent and an enormous amount of work of far reaching benefit to the country as a



Planting Pine Trees on Steep Slope

whole has been done. The French people are now suffering from a mistake for which they were not to blame. They could not foresee, when they inaugurated the idea of giving the individual an absolutely free hand, that the individual would destroy the forests, nor did they know at that time that even if the forests were destroyed such disastrous consequences would follow.

III

The work being done in those lofty, rugged mountains to prevent the ordinary small and harmless streams from becoming raging torrents, which cut away the mountain sides and carry the debris down on to the fields below each time a heavy rain occurs or the snow melts, is intensely interesting.

The work is really of two distinct kinds, the first consisting of engineering feats in checking the force of the torrents and preventing them from washing away the slopes and carrying down large quantities of debris, and the second consisting of gradual reforestation of the slopes in order to eventually make the engineering work unnecessary.

The first work is absolutely essential because, until the streams have been held in check and the slopes prevented from continually slipping, reforestation is impossible. When the slopes have been given a certain degree of permanence, reforestation is begun by first planting strips of grass and willow in horizontal lines around the slope. When the success of these strips gives rea-

sonable assurance that there will probably be no more slipping, the final step of planting the slope with trees, chiefly pine and larch, is taken. But until the forest has finally become firmly established, there is the continual danger that the engineering work will be torn out by an unusual freshet and the whole work have to be done over again. Several cases where this occurred were seen.

The basis of the engineering work is the "barrage," a dam of dry stone or mortar masonry built in the bed of the stream. The first work on any stream consists of placing a series of these "barrages" at certain regular intervals in the stream bed in such a way that the profile formed by a line along their spillways will give the angle of slope which it is desired the stream bed shall have. These "barrages" fill in above with debris so that if successful they actually form part of the stream bed. The type of "barrage" varies greatly; but in general those on the upper slopes are small and built of dry stone, whereas those in the lower part of the stream are built of dressed stones and mortar and are larger and much more costly.

IV

In order to show more clearly how this work is done, the difficulties



TORRENT OF LES GORGETTES

The upper basin, showing a series of barrages and some of the boulders which the stream carries down with it; also showing steep, almost bare slopes. The patches of vegetation seen are rapidly slipping down into the stream bed

encountered will be roughly divided into three broad classes and an example given under each class. The classes are:

1. Prevention of straight cutting down. This is generally on very steep slopes of a more or less loose and gravelly nature.
2. Bodily slipping of large masses, often many acres in extent, to be prevented.
3. Combination of straight cutting down and bodily slipping.

1. Prevention of straight cutting down. A typical example of this is the torrent of Les Gorgettes near Grenoble. This torrent, though small, is extremely steep and was very destructive before being taken in hand. It repeatedly cut an important highway and ruined considerable areas of valuable agricultural land by its deposits of large boulders and sand.

The work, which was begun years ago, consists chiefly in the building of a series of stone "barrages" in the tributaries on the steep slope forming the catchment area of the stream and in the main channel of the stream itself. These are designed chiefly to prevent further cutting down because the deepening of its bed by the stream naturally involves further crumbling of the already too steep slopes on either side. These barrages are placed at such frequent intervals in the upper and steeper parts of the stream bed that, as one looks up stream, they give the impression of a channel of solid stone. Along the base of some slopes, walls have been constructed to

prevent the slipping down of large masses of soil; in other parts of the torrent stone wings may be seen extending out into the stream to turn the force of the current away from precariously loose banks. As one walks along the rugged path up toward the catchment area at the head of the stream, he will notice clearly marked lines on the rocky almost perpendicular slopes above him. These are made



TORRENT OF LES AIGUILLES

So steep that nothing can be done with it. Notice the enormous quantity of material which it carries down (see page 204)



TORRENT OF ST. MARTIN

Large barrage, crushed for the fourth time by lateral pressure

by aspen and alder cuttings which have been planted to hold the loose soil on the slope as much as possible. (How any human being ever kept himself on those hillsides to do the planting without wings is a mystery.) These early attempts at planting, however, do not appear to be very successful and probably will not be until the slope has acquired the "angle of repose."

In the case of Les Gorgettes, floods still occur and carry away parts of some of the "barrages," and the steep slopes are still crumbling down into the torrent. But it is considered that further cutting down of its bed by the torrent has been checked and that therefore the first and most dangerous part of the work is over. The final step will be to reforest the slopes as soon as they become sufficiently permanent.

Thus, after a long period of years, through terribly hard and often dangerous work, and the expenditure of large sums of money, the forest about this stream bed may be brought to what it was before private individuals were given a free hand.

Unfortunately the case of Les Gorgettes is simple compared with some of the others. In a different part of the mountains not far from Grenoble, near the quaint little village of Vaujany, is a

torrent called Les Aiguilles, meaning "The Needles" on account of its numerous sharp points. All attempts to control this torrent have failed, and the cutting will have to be allowed to continue till the slopes have worn themselves down to a more gentle angle.

2. Bodily slipping of large masses. The best example seen of this difficult proposition was the torrent of St. Martin. This is in Savoy near the famous Mount Cenis pass through the Alps into Italy. The torrent rises in a steep basin at about 8,000 feet elevation, flowing through rather gently sloping pastures and then down a steep pitch into the main river at about 3,000 feet, a total drop of about 5,000 feet. The great difficulty occurs where it would least be expected. The large innocent looking pastures are composed of a kind of loose slaty gypsum soil which becomes saturated with water, causing large areas to slip in a body gradually but irresistibly downward toward the banks of the stream. Of the "barrages" built in the bed of the torrent one of the largest, eighteen feet high by ten feet thick, had been crushed and rebuilt thrice times and when seen had been crushed again for the fourth time by the terrific lateral pressure. The numerous smaller "barrages" had been



TORRENT OF ST. MOREL

Large crevasses formed on the edge of the plateau at the head of the ruined slope (not visible in the picture), and part of the plateau slipping bodily in such a way as to threaten the village near its edge

hopelessly broken up and carried bodily downstream for lack of a foundation. On the lower steep pitch of the torrent the whole hill is slipping bodily at the rate of twenty or thirty feet per year. Here a set of "barrages" costing \$11,000, had been so completely destroyed that scarcely a trace of them could be seen.

With such conditions "barrages" are of no avail. The only remedy lies in an elaborate system of underground drains covering the entire slopes affected. Naturally this involves an enormous expense and the drains when once built will require constant attention, because if once they become stopped up the hill will start on its downward course again. Though the work of checking this torrent was first undertaken in 1888, work on the drains has only just begun, and it will be a number of years before the people living in the vicinity of the torrent of St. Martin will be able to enjoy a sense of security.

3. Combination of straight cutting down and bodily slipping. In most of the torrents examples of this combination of conditions can be found to a greater or lesser extent. But the magnitude of destructive power of the combi-

nation is best seen in the torrent of St. Morel. This stream has been rising at frequent intervals, and at each rise has swept away large portions of the base of a slope almost a mile long above its left bank. It has done this so often that this large once fertile slope has become a mass of bare and loosened gravel. Even worse than the destruction of this hillside is the danger to two prosperous villages on a plateau above it. A large crevasse has opened at the top of the slope on the edge of the plateau and another one further back on the plateau itself. This is causing a large section of the nearly level land only a short distance from one of the villages to slip bodily towards the bed of the torrent. In addition to this destruction and danger certain prosperous communities near the mouth of the torrent were constantly threatened with being overwhelmed by masses of debris; and the Isère and Rhone Rivers were being silted up to such an extent that commerce was impeded. When work on this torrent was first begun, attempts were made to check its ravages by the usual system of "barrages." All these attempts proved failures. Finally as a last resort and in order to remedy the trouble



TORRENT OF ST. MOREL

The lower part of the torrent spreading out and ruining fertile agricultural land; showing ineffectual fences built by the communes below for protection

once for all the stream was turned entirely away from the threatened slope by piercing a tunnel through the rock on the opposite side. It was necessary not only to cut the tunnel almost a kilometer (six-tenths of a mile) long but to line it throughout with masonry at a total cost of \$260,000. In addition to the actual money spent several lives were lost in building this tunnel. As the result of this work the slope which had been undermined will in all probability continue to slip until it has filled up the former stream bed and reached the angle of repose with its base supported against the cliff on the opposite side. All danger of further slipping will then have disappeared. The lower course of the stream will be prevented from committing any further ravages on the fertile plain with its wantonly distributed and all destroying deposits of boulders and gravel, by means of a stone channel through which it will henceforth be forced to flow.

Thus after the expenditure of large sums of money and the loss of human lives, the torrent of St. Morel is at last controlled.

Considering the work as a whole, the public spiritedness as well as the skill, energy and pluck which the French people have shown in dealing with this difficult and far-reaching condition of affairs deserves the highest praise and should serve as an inspiration to other nations if they ever become afflicted with the same misfortunes. Fortunately, we in the United States have not yet reached this stage. But there are parts of this country, notably in the Southern Appalachians and White Mountains where such conditions are not only possible but very probable unless action is taken on certain bills which are now before Congress aiming at the preservation of these all important watersheds.

At the end of the eighteenth century, the French people made a mistake from which they are suffering to-day and are likely to suffer for many years to come. This mistake was made at a time when the scant knowledge of political economy made it natural and excusable. In the United States to-day there is not the same excuse for committing the same blunder.



TORRENT OF ST. MOREL

Looking up the lower part of the stream, showing how it will henceforth be kept in a stone channel

KEENE VALLEY IN THE ADIRONDACKS

Our frontispiece of Keene Valley in the Adirondacks, from an admirable photograph by George Parker, shows the group of highest mountains, Mt. Marcy, The Gothics, Wolf-jaws; to the northwest, Mt. Porter and Table-top. Starting on Mt. Marcy, a large stream, known as John's Brook, flows down through the valley, emptying into the Au Sable River at the foreground. It is one of the most important watersheds in that region. The

Rogers Company of Au Sable Falls is conducting a four-years' pulp job, taking every tree down to three inches in size. Already the stream shows the effect of it. In addition to their work, the fires have run through this region, so that there is a strip for about two miles on either side of the brook nearly bare. The company has built a seven-mile road to bring down the pulp through presumably impassable country.





CHECKING FLOODS IN THE FRENCH ALPS

Reforestation complete; one of the lower barrages in the formerly destructive torrent of La Grollay, now completely controlled by forest cover.
Few cases in France have reached such a satisfactory stage

THE INFLUENCE OF FORESTS ON CLIMATE AND FLOODS

IN DECEMBER, while the hearings on the appropriations for the Department of Agriculture were being held by the House Committee on Agriculture, Prof. Willis L. Moore, chief of the Weather Bureau, made some statements on the above subject to the committee, and these, at the request of the committee were later expanded into a printed report and sent out all over the country. The press was also urged to give it as much publicity as possible. This action was so timed as to make it appear like an attempt to discredit the proposed Appalachian forest legislation, and such was no doubt its intention. No other motive could explain such a studied effort at this time.

As Mr. Moore is a government official and other officials of coordinate bureaus, better qualified to deal with this subject, are estopped from discussing it by the present rules of the executive departments, this method of campaigning is somewhat one-sided and unfair. In order that the case, which is one of vast and increasing importance to the country, should be fairly presented, we have requested certain experts of recognized authority in their special fields to discuss the Moore report directly. We are fortunately able to present this month three papers by a forester, a geologist, and an engineer, each of whom has given this subject long and careful study.—THE EDITORS.

THE APPALACHIAN FORESTS AND THE MOORE REPORT

By FILIBERT ROTH, Professor of Forestry in the University of Michigan

THE friends of forestry, the advocates of conservation, and with them the people of the United States, east and west, north and south alike, are before Congress with a simple and modest request asking for a law which shall preserve the forests of the Appalachians, both north (White Mountains) and south.

The reasons for this request are primarily:

1. All the lands of these mountains are in private hands and the forests are cut by man and devastated by fires as fast as the owners find it practicable and profitable to do so.

2. This devastation of our forests in the eastern United States has converted

millions of acres of forest into unsightly and unused waste lands; it has ruined whole countries in the level districts of the Lake region; it has ruined entire mountain ridges in Pennsylvania; it has ruined thousands of acres of the very mountains under consideration and is to-day extending clear up to timber line in that most famous of all our mountain tracts, the Presidential Range, stretching its hideous hand of pillage and destruction up the slopes of Mts. Madison, Jefferson and Washington, the grand old domes, dear to millions of our people.

3. Unless the government interferes, this devastation will continue with increasing rapidity and it will be but few years when practically all of these mountain lands will be denuded of their protective forest cover.

4. This denudation of the mountains in many places has resulted in a com-



FOREST SCENE IN THE SOUTHERN APPALACHIAN REGION

Compare the French forest on page 208, recreated at great cost, because necessary

plete removal of all soil, laying bare the solid rock and thus preventing all future forest growth. In other places thousands of acres have been washed into unsightly and useless gully lands, and throughout the mountains and over thousands of acres, all intermediate

stages of erosion, deterioration and destruction can be seen.

5. This erosion and gullying has produced natural paths for the water and during every rain or thaw the waters rush down through these channels and thus leave the ground and the moun-

tains far more rapidly than they would if these innumerable gullies, runs, or natural ditches did not exist. Man, in other words, is causing the natural digging of drains on land where no sane man would wish to have a drain, but where common sense would indicate the necessity of creating every possible obstacle and every means which would keep the waters from gathering into runs and from rushing into the streams and out of the mountains.

6. The faster the waters collect and rush down the slopes, the more they erode the land and the more powerful they are to carry away the soil, so that this evil is one which not only continues but is getting worse the longer it lasts.

7. The earth which is thus washed out in the creation of these gullies and in the removal of soils from the slopes is rushed into the streams and sooner or later finds its way into the navigable parts of the rivers below, where every inch of depth of water is precious.

8. With the forests and other obstacles removed and with innumerable ruts, gullies and runs facilitating its speedy run-off, the waters rush from the mountains much faster and therefore have less time to soak into the earth. But in times of little or no rain, the streams depend for their supply largely, often entirely, on water which has been stored in the soil and which slowly, but steadily, seeps out to feed the streams. The rushing off of the waters on the surface and in the drains and runs reduces the storage of water and this means less water during low water times: it means less water in the rivers, at the very time when most needed.

9. The forests of these mountains have been and should be a great and permanent condition covering eighty-five to ninety per cent of all the mountain area. This is the natural condition; its establishment and maintenance therefore are not matters of costly construction and doubtful utility like artificial reservoirs. It grows of its own accord, and all it asks is that man shall not wilfully destroy it.

10. The establishment and maintenance

of a forest cover on these mountains will not be a great expense to the people. The forests on these mountains, in due time, will be self supporting and will amply pay back such capital as is put into the purchase of the lands.

11. This forest cover is the only regulator which man can maintain in these mountains, which is assuredly feasible, practicable, and permanent. Some artificial reservoirs, no doubt, will be built in time. An extensive set of such reservoirs would mean displacement of railways, highways, farm homes, etc., it would mean the making of lakes out of the very bottom lands which to-day are the only lands on which farming is successful and permanent. Such reservoirs would mean the building of many dams and bring with them the dangers of flood catastrophies. And in the end all reservoirs would certainly fill up with mud unless the entire system is safeguarded by a forest cover on the mountains.

12. The forest cover is not taking lands which should be used for other purposes, and does not prevent such use at any future time. Though among the oldest settled regions of the country, not five per cent of the real mountain lands are used agriculturally. Wherever farming is successful, it is in the valleys on good bottom and bench lands which would never be disturbed by the enterprise requested.

These mountain forests are valuable in many other ways—they produce timber, they serve as place of recreation to thousands of people, and they are worth millions for their beauty alone, but since Congress believes itself bound by the Constitution to consider the matter from the standpoint of stream regulation, the above reasons are the ones emphasized in support of the "Weeks Bill."

These reasons have evidently appealed to Congress before, for the Senate has at three different times passed a bill for this purpose, and the house has done so once. But again the opposition appears and as its champion the Chief of the Weather Bureau, Willis L. Moore, who in a "*Report on the influence of forest on climate and on floods*"



A Deforested and Eroded Hillside in the Southern Appalachians

seeks to refute the above reasons and the common belief in the influences of the forest. This report was printed at the direction of the House Committee on Agriculture, as is noted on the front page, and was evidently written for the use of this committee. To appear as argument in this connection it may be said that the very title of the paper is misleading. For it makes it appear that there is controversy as to climate and floods when in reality no such discussion exists. There is no one claiming, in connection with this preservation of the Appalachian Mountain forests that they affect the climate of the United States and even the increase of the local rainfall does not appear as an important or general claim. And yet even as to this seemingly simple matter of local rain, Mr. Moore admits (see p. 22): "*It would be difficult to either confirm or disprove this statement of Mr. Willis.*" He might have left out his "difficult," and simply admitted that Mr. Willis' statement rests on pure and simple physics, capable of experimental proof and that it is a *fact* which no one can refute. Mr. Moore, however, prefers

to add: "Certain it is that the rain is precipitated largely from air masses that exist at a considerable distance from the surface of the earth, etc." just as if he or anyone else could tell whether the water in a rain drop came from Syracuse or Utica or any particular place.

As regards the second part of the title, the "floods," it is evident that this word has been used with widely different meaning, and throughout the paper tends to mislead. There is no one claiming that a forest cover would prevent a cloud burst or one of those remarkable rainstorms where several inches of water fall within an hour and thereby lead to destructive floods (usually merely local) and no one would claim that the forests prevent a disastrous thaw such as we now witness in the Cascades of Washington and elsewhere. These are catastrophies, like a cyclone, and just as we do not expect a house to withstand or prevent such a cyclone, so we do not expect the impossible of the forest. But both the house and the forest do, even during these catastrophies, what they are able

to do, and they usually do a great deal and we believe in them. As stated above, the claim for the forest is that it prevents washing and gulying and in addition it helps to keep the soil in a condition such that water can be stored in the ground; and by its tree tops, its brush and debris it furnishes innumerable obstacles on every acre of ground which prevent the water from gathering rapidly and rushing from the slope. On the Appalachian Mountains this regulator means just these things, and means not merely an occasional affair of a few acres, but means a cover for eighty or ninety per cent of all the land and a cover which is effective, winter and summer, one which never fails, and one which maintains and renews itself. If then, in exceptional years an unusual rainstorm produces extraordinary conditions, the forest will still do its share and it will do all that it ever does, and in many cases this will mean the difference between a "freshet" or high water and a disastrous flood. Similarly it is not claimed that forests can protect reckless people who are determined to build their houses on flood lands and to crowd the river into an impossible channel as has been done in many places. The forest is no panacea, but this fact in no wise lessens its great influence for good.

In his introduction Mr. Moore mentions the fact that this forest protection "may involve the expenditure of hundreds of millions of dollars and the employment for years to come of thousands of public officials."

The first part is a misstatement of facts, and deals with a subject upon which Mr. Moore is evidently incompetent to speak, and the second part is a play on the dislike of our people for officialdom. What this sort of political clap trap has to do with a scientific exposé of forest influences is difficult to see. Certainly there can be no objection to an enterprise which will keep millions of acres of mountain lands in a productive condition rather than allow them to become useless waste lands, simply because it may give employment to many people.

Mr. Moore then proclaims himself a friend of the forest, and says that there are abundant reasons why they should be protected. He then enlarges upon the necessity of having plow land and of feeding our people and says (p. 4):

"I believe that forests should be preserved for themselves alone or not at all." Just what this means the reader must judge for himself; that it is irrelevant to forest influences, is clear enough.

Again he says (and it is also printed in italics), p. 4:

"And there can be no valid objections to decreasing the area (of forest) where homes and a well-fed people take the place of wild animals and the wilderness." When we remember that these mountains were settled about as much as they now are when Iowa was Indian country, and when we further remember that the real farm lands in the United States are hardly half used and tilled, and that millions of acres of the best of lands are not yet even settled, this statement gets the smack of the campaign document and has certainly no place in a discussion of this kind.

Mr. Moore then proceeds to discuss at length the "effect of forest on climate;" the "dessication of Asia;" "local climatic influences," "influences on temperature" and other utterly irrelevant matter. Incidentally he makes a "plea for tolerance of opinion," and discredits the "recollections of oldest inhabitants."

He then takes up the "effect of forests on flood" and admits, p. 15: *"This is a tangled problem, since the results must depend upon the slope of the ground, the nature and condition of the soil, the nature of the forests, etc."* And further on (p. 16) without any real discussion and without adducing a single important fact we see the remarkable statement: *"On the whole, it is probable that forests have little to do with the heights of floods in main tributaries and principal streams, etc."* This sentence printed again in italics for emphasis, with its "probable" and "little to do" is here put forth as conclusive proof and evidently serves as sufficient scientific evi-

dence to support his main conclusions at the end of the paper. These conclusions Nos. 7-9, are the only ones which are really germane to the subject. The first and most important reads as follows:

"No. 7. *'The run-off of our rivers is not materially affected by any other factor than the precipitation.'*" A brand new discovery in science! We are told, practically, that it makes no difference whether the land is level or hilly, whether the slope is steep or gentle, whether it is rough or smooth, whether it is cleared or covered with brush, whether it is gullied or not, all these factors have no "material" influence, the water runs off in just the same way. The fact that it is the mountain streams which have bothered the people in every part of the world by their turbulence, their floods and droughts is unknown to Mr. Moore. The fact that a prairie river like the Brazos gets on a "ram-page," and becomes a mud torrent during a three days heavy rain while a river from the forest, like the Wisconsin will hardly show a rise or sign of turpitude, all this appears to Mr. Moore *mistaken observation*, evidently of the "oldest inhabitant" and the United States Geological Survey. (Which by the way has an hydrographic office which is the only reliable scientific bureau dealing with these subjects.) That this conclusion No. 7 flatly contradicts the statement on page 15 and quoted above, where he admits that slope and soil cover do have something to do with this run-off, does not bother his logic. This conclusion is so extraordinary, so illogical, and devoid of sense, and yet so eminently well fitted to serve the purpose of the whole paper that one is forced to believe that the conclusions were specially framed on the assumption that our "busy" people and legislators read only conclusions. The other two conclusions, Nos. 8 and 9, assert, on no particular proof, that floods and droughts are no more frequent now than formerly, though he admits on page 16: "All of these problems *could be definitely settled* beyond the possibility of argument *if we had accurate river*

gaugings from day to day and year to year, etc." He evidently knows that we *have not accurate river gaugings*, but in spite of this is not afraid to assert that he (Mr. Moore) knows whether floods and droughts are more or less frequent. The use of such assertion in a scientific discussion well illustrates the character of the whole paper.

In dealing with "Run-off and absorption" Mr. Moore admits it "to be generally held" that forests affect run-off. He prefers not to discuss this matter, however, claims that plowed fields are the best absorbers, and then contents himself with the above quotations concerning river gaugings and adds, p. 16: "*We must, therefore, reason empirically from the best information at hand and this insufficiency of data renders less positive the conclusions of all investigators, no matter which side of the question they may be on.*"

This insufficiency of data evidently does not prevent Mr. Moore from making the most extraordinary assertions ever ventured in any discussion of this kind.

In this very matter of run-off Mr. Moore fails entirely to connect run-off with erosion, the gullyng or development of the innumerable drain lines due to clearing of land, and aggravated by plowing.

That every furrow, every rod of gully, acts as a drain and hastens run-off and prevents water storage, does not seem to be of importance to Mr. Moore's position. The average citizen who sees with his own eyes and not merely through the reports of rain gauge readers, and who has come to the same conclusions as his neighbors and thousands of observing people all over the country will wonder if his "reasoning empirically" is not perhaps as convincing as that of Mr. Moore.

In dealing with "Effects of Forests on Floods in France" Mr. Moore deliberately quotes certain authors by extract and is guilty of misleading statements concerning the views of prominent engineers, as is indicated by Professor Swain. He also neglects the main feature of this topic. He does not know or



STEEP, DEFORESTED SLOPE OF MT. MOOSILAUKE, NEW HAMPSHIRE

This formerly bore a noble and valuable protective forest; it is now ready for swift erosion that will permanently destroy its usefulness

is unwilling to tell that European countries generally have accepted the principle of the "protective forest," meaning thereby that forests in certain situations protect the soil and regulate water distribution and therefore deserve special treatment in law.

In France, Germany, Austria, Switzerland, etc., any piece of woods on steep ground or otherwise peculiarly located may be declared "protective forest." This action on the part of these governments was not haphazard, it came after full consideration in which the best of European authorities had a hand. Europe as a people, and Europe as a government, believes in this forest influence; and has legislated accordingly and is willing to spend money and effort on the strength of this conviction.

Just as Mr. Moore neglects to discuss run-off in its true relations to forest so he deals with erosion as if it were a subject of no consideration. How observing Mr. Moore is on this point is well illustrated by the following on page 24: "In level countries it makes but little difference in this particular whether the ground is waste, cultivated, or densely forested, etc." We have here a veiled revival of the old, worn out "low gradient" argument which used to tell us that for instance, in the great lake countries erosion could not be serious. And yet right here in Michigan, Indiana and Ohio we have hardly a section of our rolling clay and loam lands where the farmer is not troubled by erosion. On thousands of acres it requires every year extra plowing to fill up gullies, and on thousands of acres more the gullies have become so deep and numerous as to ruin the land for agricultural purposes. On every line of railway out of Washington, D. C., Mr. Moore could see hundreds of gullies which have come there since the clearing of the land. How much more serious in mountain countries! That every bit of this erosion is injurious, that thousands of tons of fertile soil wash from the land even where no distinct gullies have as yet been formed, and that every rod of gully affects run-off and thus affects water storage, flood and

drought, all this is not merely common observation but is capable of experimental proof such as was given by Wollny long ago. But Mr. Moore finds it cheaper and more effective to resurrect the "agricultural use" argument and puts in italics the following: "for the time is come—clear up the land, seed to wheat, corn, grass and fruits millions of acres that now lie idle under brush or forest."

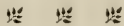
The same evasion, the same substitution of political bosh for argument.

A similar unmeaning argument is put forth in the "ratio of forested area, or mountain watershed to the total watershed." Here the fundamental argument may be stated thus: Because only ten per cent of the entire watershed of the Ohio River is mountain country and subject to flood and erosion, therefore the Ohio floods are practically unaffected by what happens in these mountains, and, by inference, there is no need bothering about this unimportant ten per cent. The argument is a typical one, and is about as sound as if some one were to say that, because the people of New Orleans form only about one-third of one per cent of all the people of the United States it is entirely unnecessary and unwarranted for the federal government to concern itself with the floods or any other conditions affecting the people of that city. That these mountains cover in themselves millions of acres of land, contain thousands of people, that their streams affect millions of people more, that the floods pouring out of these mountains endanger life and property every year, and that every regulation we can give to these waters is of the greatest importance, all these things are carefully hidden by a lot of argument about moonshine. How exact Mr. Moore's data are is clearly shown by the following on page 34: "*According to our line of reasoning which we believe to be fair and conservative it is shown* that the average discharge of the Ohio River is not greater as the result of deforestation, etc." It is *the line of reasoning* which we are asked to accept for facts and then we are bluntly told in the conclu-

sions that floods are not more numerous, etc.

The entire paper is a jumble, it deals with a lot of irrelevant stuff crudely and poorly put together. It is full of fallacy and contradiction and is an insult to the thinking and observing people of our country. But it is even more. We have here an official of the United States Department of Agriculture going out of his way to oppose a most important piece of constructive and useful legislation, exerting himself to oppose the express wishes of millions of people, of dozens of prominent associations, of several state governments. And why all this? Is it because the law is a dangerous one, one that is likely to harm any person, any district? No, it is a simple effort at keeping a few million acres covered with woods to prevent the same millions of acres from becoming waste land. Then why does Mr. Moore exert himself? Are the reasons for this law so untrue in fact? Are there exact scientific data to prove them untrue? Evidently not, for if this "report" is any criterion, *it is evident that the belief of the people of the whole civilized world is based on observation, good sense and experience, all of which seem sadly lacking in Mr. Moore's paper.*

Then why does Mr. Moore do this?



FORESTS AS FACTORS IN STREAM FLOW

By L. C. GLENN, Professor of Geology in Vanderbilt University

IT HAS been the writer's good fortune to spend a number of seasons studying in the field the problems of denudation and erosion as presented in the Southern Appalachians and in the Monongahela river basin. As the result of this study certain conclusions have been reached as to the role forests play in the production of floods, the erosion of lands, and the silting of streams that are believed to be based on too great an amount and variety of direct field evidence to be successfully controverted. This investigation was undertaken to

secure data bearing on the proposition to create a national forest reservation in the region examined. The examination showed that in many places conditions are already bad and are steadily becoming worse and that remedial measures need to be taken without delay, to protect the forests on steep slopes and to prevent erosion, silting, flood damages and interference with navigation. Because of the inter-state character of the streams involved, such remedial measures can only be taken by the federal government and several bills, the latest of which is the Weeks bill, have been introduced in Congress in the last few years seeking to remedy these conditions. Until recently the opponents of such federal action have had little or no material on which to base their opposition. Recently, however, several champions have appeared, the latest of whom is Prof. Willis L. Moore, chief of the United States Weather Bureau. A recent report by him on "The Influence of Forests on Climate and on Floods" is being widely circulated and used as an argument against the creation of these forest reserves, since the report is a denial that forests exert any beneficial influence on climate or floods.

This report of Professor Moore is too full of errors to be let pass unchallenged. Some of these errors are due to the statements made by Professor Moore being too broad and sweeping; some are due, either to Professor Moore's failure to grasp what the advocates of reforestation really propose to do, or to a failure on his part to make an adequate statement of their proposals; some are due to his confusing conditions on mountain head-waters with conditions on the lower navigable portions of river systems; some are due to a lack of information on his part of the actual conditions that prevail over thousands of square miles in the Southern Appalachians. Furthermore, a considerable portion of the report is not pertinent to the case in hand, so that when the non-pertinent and the erroneous portions are discarded there is but little left. So much for a general state-



ASBURY FRANCIS LEVER

Representative from the Seventh South Carolina District who has had charge of the Weeks bill in the Committee on Agriculture, from which it has just been favorably reported.

Mr. Lever was born at Springhill, Lexington County, South Carolina, January 5, 1875; graduated at Newberry College, 1899, and from the law department of Georgetown University, 1899, when he was admitted to the bar of his state. He was private secretary of Hon. J. William Stokes, whom he succeeded in Congress in 1900, upon Mr. Stokes's death. Mr. Lever was a member of the state legislature in 1900, resigning to make the run for Congress, to which he has been four times reelected.

ment as to the nature of the report. Let us examine it in some detail.

On the opening page he says, "It has frequently been stated that forests control the flow of streams, both in high-water stages and in low-water stages, * * *." This statement may be technically correct but is certainly misleading since it is not generally contended to-day that forests *control* but only that they *strongly influence* in a beneficial way the high and low water flow. If they *controlled* the flow presumably floods would be unknown.

Page 4 is misleading inasmuch as nobody proposes either to reforest or to keep forested lands that would subserve a higher usefulness as agricultural lands than they would as forest lands. The lands it is proposed to keep in forest are either those too rough to be of any agricultural value or those too steep to be cleared because of the danger of rapid erosion and ruin and the consequent destruction of lower lying lands and other property in the same drainage basin as well as to the streams themselves and navigation interests from silting and increased destruction due to floods. Lands so steep that under present careless methods of agriculture they are properly classed as forest lands may by improved cultural methods gradually come to be agricultural lands and so provide in the future for the time when population presses upon subsistence, but at present in the Southern Appalachians the people would be better off if they cultivated less land rather than more land. Professor Moore's phrase "the pleading of the poor man's children for bread and meat" used in the same connection on page 4 as an argument for further deforestation does not apply to conditions in the Appalachians and so is not pathetic, however well it may sound.

Nor would "homes and a well-fed people take the place of wild animals and the wilderness" as Professor Moore would lead one to suppose but rather a desolate waste would soon result, rain-scarred on the slopes and flood-swept in the valleys. Such destructive

processes are actively at work to-day in these mountains and would only be made worse by adopting his proposals for further deforestation.

Near the bottom of page 4 the statement "It is found that *in some limited areas* where the forest is cleared away, the soil, owing to its nature and slope, will not admit of successful cultivation,"—(italics the present writer's)—is misleading. The writer would like to know how Professor Moore found that such areas are so limited. Personal examination shows that at least two-thirds and perhaps three-fourths of the southern mountain area will not admit of successful cultivation under present methods of agriculture and probably half of it could not be safely cultivated under any improved methods of farming likely to be introduced for years to come. The phrase "some limited areas" is therefore misleading in that it unduly minimises the extent of the non-agricultural area and tends to belittle the problem that demands solution. It would seem to be merely the personal opinion of its author and is not supported by the facts in the case.

On the top of page 5 it is admitted that such areas would be fit places for national control if it can be demonstrated that conditions there materially affect the navigability of streams. *An examination of the Tennessee made by the writer does show that much material eroded from the steep mountain slopes is accumulating in the navigable reaches of that river and is injuriously affecting navigation. This material tends to fill the deeper pools, to lodge on the shallow bars, to obliterate dredged channels, and to aid in the growth of islands, the displacement of the channel, and the undercutting and caving of the banks.*

Pages 5 to 15 discuss the effects of forests on climate particularly with regard to their influence on rainfall and on temperature. So far as the writer knows no one is claiming that there has been any such serious change in the rainfall or in the temperature in either the Northern or the Southern Appalachians as a result of deforestation, as

to base on such change any important argument for congressional action. The pages devoted by Professor Moore to such discussion are not pertinent to the case at all.

In discussing the influence of forests on floods in the latter half of his paper Professor Moore fails to distinguish between the characteristics of the many non-navigable head-water tributary streams and those of the main navigable stream. It should be kept clearly in mind that the steep mountain basins of these head-water tributaries are the areas where reforestation is advocated because they are the areas of greatest erosion and greatest flood damage. The marked increase in the frequency, height and violence of floods in recent years in the Southern Appalachians has been on these head-water tributaries such as the Doe, the Watauga, the Nolichucky and the French Broad, for instance, of the Tennessee system and not in the lower Tennessee itself. In March, 1907, for instance, the remarkably destructive flood in the Ohio river system was at and above Pittsburg, not down at Cincinnati, Louisville, or Cairo. On the Savannah, the Broad, the Catawba, and all other large rivers heading in the Southern Appalachian mountains the locus of maximum flood violence and destruction is near where they, or their head-water components, first leave the mountains, not far out on the plains along their middle and lower reaches. Professor Moore confuses these two portions. Instead of focusing his attention on the navigable middle and lower parts of a river system like the Tennessee, he should become acquainted with the upper or head-water part. Colonel Chittenden and other army engineers fall into the same error. The navigable portion of any large river system does not exhibit such marked change of regimen as a result of deforestation as its constituent head-water tributaries do. Each of these tributary basins is small enough to be affected throughout its entire extent by unusual weather conditions and the tendency in such basins is toward an

extreme condition while the tendency in the trunk stream formed by the union of many of these tributaries is to a *mean* of the conditions, either high or low, that characterize the tributaries. Profound changes in the high and low water stages of certain mountain head-water tributaries might occur without producing any strongly marked change of regimen in the middle and lower reaches of the trunk stream. A flood on the Watauga, for instance, five feet higher than any ever previously known and utterly destructive of all property within its reach might not add a couple of inches to the stage of the Tennessee at Chattanooga or be perceptible at Paducah. Professor Moore and others are either ignorant of the locus of maximum flood damage or confuse it in their reasoning with conditions in the middle and lower part of the stream basin where such extremes do not occur. Most of their arguments apply to these lower reaches. It is believed by the present writer that a very general change of regimen on the head-waters will be reflected in a corresponding mean change in the high and low water stages in the main trunk stream in any large river system but this mean change will be far less striking on the trunk stream. It should be remembered, however, that so far as the navigable middle and lower parts of a large river system are concerned the amelioration of flood and drought conditions is not the only, and may not in a given case be the chief, effect, but that the prevention of erosion of steep slopes and the consequent serious silting of the navigable portions of the streams will also be a most important effect of reforestation.

In discussing run-off and absorption on page 16 it is not sufficient for Professor Moore to say that "it can be shown that the run-off from a smooth surface and from one covered with sticks, dense grasses, or forests are *equal* (italics mine) after the rough surface becomes saturated." They may be ultimately *equal* in total volume of run-off but still be far from equal in



Sand Deposited on Alluvial Bottoms by Freshets, 1901, Catawba County, North Carolina

rapidity of run-off and it is the *rapidity* of run-off that counts in flood production. It is a matter of elementary physics, merely, to show that the rapidity or velocity of run-off from a rough surface such as a forest covered one would not be as great as from a smooth one of the same slope, whether the sub-surface were saturated or not.

The writer feels very certain from his field studies that the absorptive capacity of the average Southern Appalachian forest area is very materially greater than the absorptive capacity of the average cleared field in the same region, and this balance in absorptive capacity in favor of the forest is a potent factor in preventing or mitigating flood disasters. Up to a certain maximum limit of rainfall that would vary in each individual case, the forest cover would prevent any run-off at all; if the rainfall be doubled the forest cover

would retain half of it; if quadrupled a fourth; and if in torrential down-pours it retained only a tenth, say, of the rain that fell, it is still just so far beneficial in its influence and without it the resulting flood would be just so much the worse. It is illogical to conclude that the forest has no beneficial influence merely because it fails to control floods entirely, and it is in the very worst floods that any ameliorating influence is most needed. It may be remarked that the writer knows no kind of vegetation on cleared land in the Appalachians that exerts anything like as great a conserving influence on the rainfall as the forest does, simply because the covering of humus and litter in the forest is both thicker and a more efficient absorptive agent than any vegetable cover on the cleared land.

In regard to the quotation from the French engineer, Mr. St. Clair, on page

18, it might be of interest to Professor Moore to learn that of the two types of springs there described,—the small or superficial ones, drawing their supplies from the strata very near where they issue and the large or deeply subterranean ones drawing theirs from long distances and large areas as in limestone regions—only the first or local type of springs is found, except in a few rare cases such as at Warm Springs in North Carolina, in all the Southern Appalachian region and Professor Moore's French author admits the increased irregularity of flow and even the drying up and entire disappearance of such small springs as a result of cutting away the forests. This is exactly in accordance with what is found in the field in the South and had Professor Moore known the actual conditions in the region about which he was writing he probably would have omitted this quotation.

Several pages are devoted by Professor Moore to discussing the academic question of the source of flood waters in the United States. Whatever the source of these waters no one has yet proposed to alter or change in any way the general system of atmospheric circulation over the country at large and until this is successfully done the rains will continue to come from the same sources as of yore. *It is not a question of where the rains come from, but what we are going to do with them—or they with us—after they have gotten here.*

Erosion is handled very briefly and lightly by Professor Moore and no very definite conclusion or conviction as to it is expressed. Erosion is, however, one of the most powerful destructive agencies at work in the mountain region and is of supreme importance in any study of the relationship between forests and streams. There is not room here for any detailed discussion of erosion but it will be referred to again in discussing the question whether floods are increasing or not.

In discussing the ratio of the forested area, or mountain watersheds, to the total watershed there is the same failure to appreciate the differences between

these mountain watersheds and the rolling or level plain portion of the great stream systems that has been noted already.

The flood problem so far as the lower, more nearly level lands is concerned, is not a forestry problem but an agricultural one and nobody is proposing to consider it as a forestry problem.

On page 25 Professor Moore italicises two consecutive sentences, each of which demands some brief comment. They are as follows "*The rugged mountain slopes and tops, where land has little value, are unimportant as flood producers. It will be necessary actually to reforest the lower slopes and valleys where the land is of great value and where it should be devoted to agricultural purposes.*" In the first of these sentences there is, apparently, the former confusion of linking steep mountain slope causative factors directly with mid and lower main stream flood results and there is at the same time apparently a total ignorance of the perfectly evident fact that these rugged slopes are most important flood producers in such large tributary basins as the Watauga, the French Broad, the Pigeon and the Little Tennessee, all of which lie among the mountains themselves. With regard to the second sentence above quoted one wonders if there has been a slip of the pen or if, despite all of his arguments to the contrary, its author really means to say that forests do after all exert an efficient regulative influence on flood production.

The last topic discussed is whether floods are increasing. Here again Professor Moore has in mind floods on the lower, navigable portions of stream systems. His argument and array of statistics, when balanced against Mr. Leighton's opposing ones, are at most not convincing. The present writer, however, has studied in the field certain processes that are of such widespread occurrence and distinctive character as to leave no doubt that floods are increasing both in frequency and in height. These processes have to do with erosion as the chief causative factor and a very brief statement concerning them becomes necessary.



ON THE TENNESSEE RIVER, NORTH CAROLINA

Pines that sprung up in this badly gullied pasture were cut out. They would have checked the wash

Under natural forested conditions streams in steep-sloped mountain basins receive comparatively little eroded material from their slopes and expend much of their energy in eroding their beds and so soon produce good deep channels that are efficient agents for the rapid removal of flood waters. Such deep stream channels may be seen in any well forested region. When the steep slopes have been denuded of their timber, however, they are rapidly attacked by erosion and the soil and disintegrated rock are swept into the stream channels in such great quantities as to overload and choke the streams and soon fill up their deep channels and even cover up their former flood surface. With their deep channels obliterated, the streams can no longer remove rainfall efficiently and rapidly and it consequently accumulates and rises to greater heights than formerly. Furthermore, many a small rain

that, with the former deep channel well fitted for the rapid removal of flood waters, would have failed to make a bank-full stage, now overfills the greatly shallowed channel and spreads as a flood over the adjacent lands, so that there can be no doubt that in the denuded and eroded mountain basins of the size of the French Broad or the Nolichucky, for instance—each of which are good sized rivers—floods are to-day both higher and more frequent than they formerly were under natural forested conditions.

The problem of whether floods have increased in height and violence in recent years may be approached from another and in many respects a more certain and satisfactory viewpoint than either that just given or that of the meteorologist dependent on his gage readings. This third viewpoint is that of the geologist and physiographer, and

its superiority consists in the great length and permanence of the record and in the unmistakable character of the data it furnishes to one skilled in reading such a record.

The meteorologist depends on gage readings of flood heights, made by man and often incomplete, the best of which in this country extend back for only a few score years and in Europe for only a few hundred years. The geologist depends upon records thousands of years in length made during all the long ages in which the valley and the flood plain were forming and written in the materials of the flood plain and in the width, slopes, and other features of the valley. Beside these records the length of even the longest meteorological gage records becomes insignificant.

The flood plain deposits that have been built up by the ages of slow flood activity reveal the character of the floods by which they were formed. If these have been gentle, the deposits will consist of fine alluvium; if they have been violent, the deposits in a region such as the Southern Appalachians, will be correspondingly coarser and will consist of sands, cobbles, or boulders. If the sands, cobbles, and boulders that have been repeatedly strewn over their floodplains in the last few years by such streams as the Watauga, the Doe, the Nolichucky, the Catawba, and other southern rivers had been the kind of material these rivers had for ages been accustomed to deposit, their entire flood plains would be composed of such coarse materials instead of being, as they are, of fine rich sandy loam or clay. Had they at any time in their past history been accustomed to build such coarse material into their floodplains that material would be there to-day as a mute witness of the fact. It is only of recent years, however, that they have formed such coarse deposits because only in recent years have their floods had the height, velocity, and power to enable them to carry such coarse materials. The normal change in the regimen of a river as the ages pass is such as to make its flood plain deposits grow constantly finer. In these rivers, however, this

process is reversed and thin deposits have recently grown coarser. This recent anomalous change in the regimen of these rivers can only be due to the denudation and erosion that have resulted from man's activities in the region. *The rivers of the region have recently changed their regimen and floods have become higher and more violent, else sands, cobbles, and boulders would not have been strewn during the past decade over the finer alluvial accumulations of many previous centuries.*

Finally, to say as Professor Moore does in his summary, that the run-off is not materially affected by any other factor than precipitation is ridiculous.



"THE INFLUENCE OF FORESTS ON CLIMATE AND ON FLOODS"

A Review of Prof. Willis L. Moore's Report

By GEORGE F. SWAIN, LL.D.
Professor of Civil Engineering, Harvard University

IT MAY be well to preface this discussion by a brief reference to the proper methods of scientific investigation, because these are often forgotten, even by those who lay claim to scientific acquirements, and because it will be shown in what follows that in the paper under consideration such has been the case.

In the investigation of scientific phenomena two methods alone may be employed: The inductive and the deductive.

If the relations between two phenomena are to be studied by the inductive method, the process is to collect observations, or to make experiments, in which one of these phenomena is varied, while the effects upon the other are observed. The method consists in accumulating a sufficient number of such observations and experiments, and from them drawing generalizations. It is a statistical method—a reasoning from particulars to general principles.

In the deductive method the process is reversed; starting from general principles all conclusions are deduced from



Southern Appalachian Mountain Field Ruined by Erosion

them; the reasoning is from general principles to particulars. Omitting metaphysical subtleties, it may be said that the general principles which form the starting points may be obtained in either of two ways: they may be truths which the mind perceives or arrives at without experiment or observation, such as the fundamental truths of mathematics and mechanics; or they may be truths which themselves have been arrived at by induction and which are then used as the basis of deductions.

Some minds instinctively prefer one of these methods, some prefer the other. Some people are only satisfied by statistical proof, or what appears to be such. I presume some people would require a statistical proof of a future life; they would desire to have records of interviews with departed spirits, to know how many of such departed spirits said they were alive, and how many said they were dead, and whether the proportion of those who said they were alive had increased in recent years. Some minds, on the other hand, seem almost incapa-

ble of inductive reasoning. They must start with fundamental principles and reason from them, and if they have no fundamental principles to start with, they will create them from their own imaginations.

Clearly, a proper combination of both methods, using each where it is applicable, is the basis of reasonable scientific investigation.

DIFFICULTIES WITH THE INDUCTIVE METHOD

There are several serious difficulties which are likely to be encountered in the application of the inductive method, and many precautions which must be taken if error is to be avoided.

In the first place, a very essential point to be observed is, that in order to determine the effect upon Phenomenon B which is exerted by Phenomenon A, the observations or experiments must be so conducted that, of all the elements which may effect B, all remain constant excepting A. In other words, only one

phenomenon at a time must be varied. If the physician wishes to determine whether mince pie is a cause of indigestion, he will not give his patient, at the same time, mince pie, lobster salad and Welsh rarebit, for, if he does and indigestion results, he cannot fairly attribute it to the mince pie. If a metallurgist wishes to determine the effect of various percentages of carbon upon the strength of steel, he must be very careful to procure a number of samples of steel precisely alike in every respect, except that the percentage of carbon varies; and it will not do, in such a case, to say that because there is only a *slight* difference in the percentage of some other element, such as nickel, the experiments prove the effect of the carbon, because it may be that an extremely small variation in nickel would have more effect than a large variation in carbon. Only one element must be varied at a time, and this is an extremely important consideration.

A second difficulty arises with the inductive method if the observations vary very greatly from each other. If, for instance, it is desired to find the effect of Phenomenon A upon Phenomenon B, and if this effect in any case is small, while Phenomenon B, is exceedingly variable, it may be difficult to show by statistics that Phenomenon A has any effect at all, though that effect may be unquestionable. There are other matters affecting the general methods of scientific investigation which are suggested by this paper, but they will be taken up in connection with the specific points in Professor Moore's paper which illustrates them.

EFFECTS OF FORESTS ON RAINFALL

Fourteen pages out of thirty-six in Professor Moore's paper are devoted to a discussion of the relation between forests and rainfall.

This relation is of no consequence so far as concerns the Weeks bill, or the claims made by those who believe that the government should acquire forest reserves. No one has insisted, so far as I know, that forests have any consider-

able effect upon rainfall. Mr. Pinchot in his "Primer of Forestry" states that no generally accepted result has yet been reached in the matter; that the observations are not all in agreement, and concludes by saying: "The truth probably is that more rain falls over the forests than over open country similarly placed, but how much more it is impossible to say." Professor Moore deals with this subject as though it were one of the most important involved. He quotes from several authors with reference to desiccation in other countries, where the rainfall, once abundant, has become much less or disappeared entirely, and says that "this decrease or precipitation might better be regarded as the cause rather than as the result of the barren condition of the soil" * * * "that the forests ceased to exist when the rainfall became deficient;" and he seems to think that this proves that forests do not increase the rainfall. He compares the rainfall records in New England and in the Ohio Valley for the past seventy years and concludes that it is not decreasing. His conclusion on this point is stated in the following paragraph:

"In New England, where deforestation began early in our history and has been extensive, the mean of the fluctuations of the rain-curve is a steady rise since 1836 up to a few years ago, and in the Ohio Valley, where the forest area has been greatly diminished, there has been no decrease of rainfall shown by the average of the fluctuations of the curve. These facts are important and cannot be successfully disputed."

A careful examination of Professor Moore's statements will show that they offer no proof whatever that forests do not affect precipitation. It is admitted that climatic and geologic changes are taking place very slowly at many places on the earth; mountain ranges are being elevated, other districts are subsiding, ocean currents are changing, and in the course of thousands of years variations in climate, including temperature and rainfall, result. Undoubtedly forests have disappeared in many places because the rainfall has been diminished;

but that does not prove that the forests may not increase the rainfall; a man ceases to drink water after he dies, but that does not prove that the drinking of water has no relation to keeping him alive. There may be; and no doubt is, a reciprocal relation between the forests and the rainfall. If the rainfall disappears the forests, of course, will die, and great climatic changes may make the rainfall disappear; but, all the same, the forests may increase the rainfall.

As a matter of fact, this subject affords an excellent illustration of the imperfections of inductive reasoning in this case. The rainfall is an exceedingly variable quantity; the annual rainfall this year may be double what it was last year. Even taking the average in ten-year periods, Professor Moore's curve for New Bedford shows an average of about forty-nine and a half inches in the ten years from 1820 to 1829, and forty-three and one half inches in the ten years from 1840 to 1849. In 1883 the rainfall near Boston was thirty-one and two-tenths inches; in 1888 it was fifty-six and ninety-three one-hundredths inches; in 1892 it was thirty-nine and four one-hundredths inches. Moreover, these observations of rainfall themselves are subject to large errors. A rain-gauge whose mouth stands one foot above the ground may collect six per cent more water than if it were placed level with the ground, and if placed higher the difference may be still greater; moreover, the methods used for



VIRGIN SPRUCE IN WHITE MOUNTAINS

But little of this once typical forest remains

measuring the snowfall and reducing it to inches of water involves errors, and there are still other sources of uncertainty. Considering that, even if the forests are untouched, the rainfall over a given area may vary fifty per cent or more in consecutive years, how can it be expected to demonstrate by a comparatively few years of observations the effect of the forests—which, in any case, will be small? Any effect of the forest would very likely be less than the probable error of the observations themselves. Under these conditions, therefore, the inductive or statistical method fails. What then, are we justified in doing?

Professor Moore draws this conclusion: "Precipitation controls forestation, but forestation has little or no effect

upon precipitation." He further makes "a plea for tolerance of opinion" and, presumably in connection with this plea, quotes the very intolerant opinion of Prof. Cleveland Abbe: "In this day and generation the idea that forests either increase or diminish the quantity of rain that falls from the clouds, is not worthy to be entertained by rational, intelligent men." If he were presenting a fair and a scientific discussion, recognizing that the inductive or statistical method will not give definite results, he would see that we must resort to the deductive method, provided we can find some fundamental principles, reasonably established, upon which to base our deductions. He recognizes, indeed, that the statistical method will not work for he says: (page 16) "All of these problems could be definitely settled beyond the possibility of argument if we had accurate river gaugings from day to day and from year to year, together with a full knowledge of the rainfall and of the proportion of wooded to cleared areas, data which, unfortunately, we do not have." But, he goes on to say, incorrectly, that we must, therefore, "reason empirically from the best information at hand." Empirical reasoning will scarcely lead to reliable results.

Now as a matter of fact, there are several well established principles which bear upon this matter, and which give very good *a priori* reasons for believing that forests do slightly increase the rainfall. The first of these Mr. Moore mentions (page 22) quoting from Prof. Bailey Willis:

"The mountains are wet because they are high, and they are heavily forested because they are wet. But there is also a reciprocal action of the forests on the wetness, for the radiation from the dark-green expanse is comparatively uniform and promotes frequent and steady rains. Were the mountains bare they would, like the bared sierras of Spain, receive occasional but violent downpours and send down excessive and disastrous floods, even more disastrous than now. * * * For in-so-

far as we clothe the surface with green crops we lower the temperature of the rising air and favor precipitation on the verdure-covered plain."

Regarding this statement by Professor Willis he goes on to say "It would be difficult to either confirm or disprove this statement of Mr. Willis." If this is the case, why does he draw the conclusion that forests have no effect? It would be fairer, as well as more logical, to simply say, what is the truth, that many competent meteorologists believe that forests increase the rainfall, that there are good theoretical grounds in favor of it, but that the effect is slight, and difficult if not impossible to prove by observations, considering the variability of the phenomenon.

It is a reasonably established fact that forests decrease the mean annual temperature. This has been proved by many observations. They therefore bring the air nearer to the point of saturation, and therefore tend to increase the rainfall. Professor Moore argues that this effect amounts to nothing because "the rain is precipitated largely from air masses that exist at a considerable distance from the surface of the earth." The height above the ground at which vapor is condensed in the air is variable; it may be at a great height or it may be close to the ground. On mountain sides, particularly, the condensation may occur at, or even below, the level of the forest. We all have seen rain falling from clouds lying at a height considerably below the tops of mountains or even high hills. Any effect of the lowering of the temperature produced by forests, therefore, will be particularly noticeable in mountainous regions. Just how much the effect will be will depend upon various circumstances; among others, the distribution of the rainfall through the year, for the effect of forests on temperature differs in summer and winter; but with a rainfall distributed with tolerable uniformity through the seasons, the resultant effect should be to increase—even if but slightly—the amount of rainfall.

A second principle from which we

may proceed in this matter, is the effect of forests on evaporation. By cooling the air and obstructing the wind, forests reduce the evaporation from a water surface, but the trees themselves evaporate considerable quantities of moisture, so that the total evaporation over a wooded area is generally considered to be greater than over a cleared area. Those who oppose the preservation of the forests sometimes make a great point of this. Now, the precipitation of rain depends fundamentally upon the amount of vapor in the atmosphere; most of this vapor comes from the great oceans and is carried by the winds over the lands; but if, as it proceeds over the land it is joined by more vapor evaporated from the land itself, there will be all the more vapor in the atmosphere to be condensed when the conditions which produce condensation occur. Any cause, therefore, which increases the evaporation must increase the rainfall; and if—as there is good reason to believe—the growth of forests increases the total evaporation from an area, it would seem they must increase the rainfall.

This does not mean that if I planted trees in my back yard I will increase the rainfall in my backyard; neither does it mean that if forests are planted on a spit of land projecting into the sea like Cape Cod, the rainfall on Cape Cod will be increased. The vapor is not precipitated where it is evaporated, but is carried long distances; some of it may be precipitated on the land and some on the sea. Generally speaking, however, the argument would seem to be sound; that is, if forests increase evaporation they must increase the rainfall somewhere.

All this, however, is of little consequence as compared with the larger question, and the main question, as to the effect of forests upon floods and the navigability of streams. It must also be remembered that those who are in favor of the Weeks bill do not argue, as Professor Moore would seem to make it appear, that the forests must be preserved on areas suitable for cultivation and needed for cultivation. "The pleading of the poor man's chil-

dren for bread and meat" referred to by Professor Moore, is a sentimental obscuring of the question. What is claimed is that on the steep slopes and mountain sides which are not suited for agriculture, the forests should be preserved, not only as a source of lumber supply but as a protection against the fires which are most apt to start on the cleared lands, and as a protection to navigation by preventing erosion and the silting up of streams, and also as a source of beauty and health; but the legal justification must, as already stated, rest solely on the effect upon navigation.

EFFECT OF FORESTS UPON FLOODS

In studying the effect of forests upon floods by the statistical or inductive method, we meet with even greater difficulties than in studying the effect upon rainfall. One of the most important of these difficulties arises from the fact that *we cannot vary only one element at a time*. Not only is the rainfall different in different years on a given area, but the proportion of that rainfall which flows in the streams, even if the rainfall is precisely the same, may vary in different years by 100 per cent. In 1871 the rainfall on the Cochituate watershed was forty-five and thirty-nine one-hundredths inches, of which thirty-three per cent flowed from the surface, the remainder being either evaporated or sinking into the deep strata; while in 1891 the rainfall was almost exactly the same, namely forty-six and forty-two one-hundredths inches, of which sixty-nine per cent flowed from the surface; in 1874 the rainfall was thirty-five and ninety-three one-hundredths inches, of which fifty-four per cent was collected; in 1880 the rainfall was thirty-five and eighty-three one-hundredths inches, of which only twenty-nine per cent was collected. Equal variation occurs in the manner in which this water flows off; a large amount may flow off without causing a flood, or a smaller amount may flow off causing a great flood. Now, in order to demonstrate by induction the effect of forests on floods,

it would be necessary to have the same area under identical conditions except that at one time it should be forested and at another time it should be deforested; this condition is manifestly impossible of attainment; it never has been attained and it never will be. In the published comparisons which are found in various papers dealing with the subject, the conditions are never the same. A curious fact, however, is that Professor Moore and some other writers should not think it even necessary to make any statement as to the proportion of given area under discussion which is covered by forests. Professor Moore thinks he shows that the floods in the Ohio River have not increased, but he does not even tell us and does not seem to think it necessary to inquire whether the total forested area has increased or decreased and how much. He reasons entirely from one premise. He says: "The floods have not increased, I do not know definitely about the forests, therefore the forests have no effect on floods."

Now while there has been great cutting on the mountain slopes during the past decade or two, it is very possible that some other slopes which had been cut previously have been growing up, and the total forested area may have changed but little. Certainly no conclusion worthy of credence can be drawn until this point is investigated.

Statistical reasoning, therefore, is unsatisfactory in this case as it is in connection with rainfall, and we must therefore resort to deductive reasoning based on simple fundamental principles; and here again there are two principles which every observing man knows to be true and which no amount of specious reasoning like that of Professor Moore will suffice to counteract.

These are, first, that the forest retards the discharge of water from the surface of the ground. The forest causes a million dams, which obstruct the surface water and cause it to trickle along slowly; it also forms a bed of humus which is able to absorb this water; beneath which is a porous ground which can carry it still deeper.

When a sudden downpour comes, not only do the forest trees intercept a portion of rain on their leaves and branches and allow it to trickle gradually down the trunk or drip to the ground, but the water, when it reaches the ground, is obstructed and has time to sink in, and finds something to sink into. On the open ground, on the contrary, on steep slopes (and it is only these that we refer to) a sudden downpour causes the water to be discharged quickly over the surface into the streams. If the forest then, as every reasonable man knows is the case, retards the surface run-off, it must, on the whole, diminish the violence of freshets.

The second fact of importance is that the forest retards the melting of the snow; everybody familiar with the country knows that in the forest the snow lasts considerably longer than it does in the open, although there may be isolated drifts in the open where certain beds of snow may linger longer than the snow in the forest. On the whole, and speaking generally, forests retard the melting of snow, and therefore every reasonable man will conclude that they must, on the whole, by causing the snows to be discharged in a longer time into the streams, reduce on the average, the floods. Moreover, by facilitating the percolation into the ground and the subsequent slow giving out of the percolated water by springs and seepage, the forests must, on the whole, maintain a higher low-water flow in the streams.

Professor Moore's arguments on this point—if they may be called arguments—are in part faulty and in part based on a misconception of the question, as will now be shown.

In the first place, the sum and substance of his claim is that forests do not decrease the *extreme* floods or increase the *extreme* low-water flow. This has long been admitted by competent hydrologists. It is even possible to conceive circumstances under which the presence of a forest might increase the flood which, if the forest were not there, would come from a given area. But the navigability of streams, the forma-

tion of bars, the silting up of channels, do not depend upon extreme conditions. Three or four moderate floods may do as much damage to a navigable river as one extreme flood, and may bring down more sediment to be deposited in the river bed. Professor Moore's authorities in this particular discussion are Prof. Cleveland Abbe and two French engineers, M. Belgrand and M. Vallés, both of whom wrote their original discussions on this subject over fifty years ago. To his quotation from Professor Abbe we need pay little attention, as it has reference to level ground, whereas we are discussing the effect of forests on steep slopes. Ploughed and cultivated land is very likely quite as porous and quite as able to absorb rain-water as forest ground, as Professor Abbe says. It is quite easy to understand, however, how he can make out that "under a forest less rain *actually enters the humus*," and yet goes on to say "that the amount of water that is eventually *given up from the forest humus* varies but little from that given up in the course of time by the unforgotten cultivated soil." Less rain enters the humus but essentially the same is given up from it.

With reference to the French writers, Belgrand and Vallés give exactly the same arguments that are advanced by Professor Moore, and by Colonel Chittenden in his recent paper to which the present author published a reply a few months ago. A sample of M. Vallés' reasoning may be quoted to show the kind of logic which appeals to his mind. He says that the forest ground is less porous than bare ground because if you should ask a laborer in which he would prefer to dig a hole he will select the latter. He might as well argue that an acre covered to a depth of ten feet with a mattress of barbed wire was less porous than hardpan for the same reason. As a matter of fact, both of these authors entirely agree with the position taken by the present writer and by those who urge the passage of the Weeks bill, that forests should be maintained on steep slopes which are unsuitable for cultivation. Belgrand says:

"The operation of reforestation is thus excellent when practically possible, although it seems demonstrated that the deforestation of the basin of the Seine cannot be considered one of the causes which contributed to increase or to decrease the height and the number of floods. *But the forests diminish very notably the volume of earthy matter transported by the streams, because they prevent the erosion of the earth, and, it must be recognized that the impoverishment of the earth is much more to be deplored than the disasters caused by floods.*"

M. Vallés says: "If the demand is limited to the reforestation of the summits and uncultivated slopes, we wish well of it, but less from the point of view of diminishing the quantity of water discharged than from that of preventing the erosion of the earth, particularly if a study is made of reforestation in itself, which shall indicate to us, first, in what circumstances it can be realized, and in the second place, under what conditions it will be useful at the same time to private interests, and will be for the general good. If it is thus that we are to understand the advocates of this system, we do not hesitate to join with them; but if their demands are more extended, if they wish us to reestablish on ancient foundations a condition of things which has been usefully modified, if they desire that we should prefer the Druidical forests to our modern farms, the trees to the corn, the corn to the grain, we say to them for the third time: reforestation will not do."

Bearing in mind that Professor Moore's argument was written as a contribution to the discussion involved in the Weeks bill, it would be interesting to inquire why he did not quote these two passages, if he knew them. If he did not know of them he should not discuss the subject and give the erroneous impression that these authors denied the necessity of preserving the mountain forests.

Equally misleading is Professor Moore's quotation from the Austrian engineer, Mr. Ernest Lauda (page 19) and the conclusions of the Tenth Inter-

national Congress of Navigation held at Milan in 1905. Professor Moore says that Mr. Lauda's conclusions are "that progressive deforestation of the country has had no effect in increasing floods nor in augmenting their height." Let us read Mr. Lauda's conclusions as presented at the Congress in Milan. He says:* "If now the final judgment on the subject of the influence of forests on the regimen of streams be unfavorable to the forest to this extent, that there are denied to it certain of the properties attributed to it generally, it does not follow from this that it is necessary to oppose the re-wooding of arid surfaces, the replanting of the basins of streams, or the maintenance of plantations of trees. The general utility of the forest is so well settled, the extraordinary appreciation in which it is held, *as a means of protecting the soil against landslides*, is so firmly established, its great advantageousness, especially for the spring district, in holding back earth thrusts and *reducing the amount of sediment carried by rivers* so important, *that these reasons alone justify fully the greatest possible promotion of forest culture.*"

Any fair discussion would have included this reference.

Professor Moore, referring to this Congress says: "The writers heartily favor the protection of the forests and their cultivation" but "they were unanimous in the opinion that forests exercise little influence upon either the high water or the low water of rivers.

Let us now quote from Cipolletti's review of the conclusions of this congress. He says:*

The other part of the question, concerning the influence of forests upon surface waters, is perhaps the most important of all and to all; and it is, no doubt, the one upon which our authors' opinions differ most. One may state, that they all recognize, or at least none denies, the beneficial influence of forests upon the regimen of a river in its state of low-water flow, high-water flow, and ordinary floods; but many of the writers, we may say the majority of them, deny that forests have any power not only of preventing, but even of mitigating to any appreciable extent the more serious and damaging floods, which occur in every country at certain periods.

The low-water flow—as is commonly known—depends almost exclusively on springs; and having once admitted the fact, that a covering of trees exerts a beneficial influence upon the flow of springs, we may at once draw from it the legitimate conclusion, that the regimen of low-water flow of a river is favourably affected by the existence of forests in its basin; except, be it well understood, the cases already alluded to, of an extremely permeable soil or of lands which can be cultivated without the loss of the humus covering, cases in which, as has already been stated, it is possible that deforestation may help the absorption of the water into subsoil and thereby increase the volume of the low-water flow in the general recipients, the rivers.

But with regard to the regimen of high-water flow and ordinary floods, there is no material difference of opinion. In such localities the waters running off the surface unite with the springs in providing the supply of water for a river. Thus, all the writers agree that forests exert a moderating influence on the run-off of surface waters, owing to a large proportion of the water being retained by the leaves and other parts of the plants, also on account of the quantity of it being absorbed by the layers of dead leaves, moss and humus which form the top covering of the forest ground, and partly also to the obstruction which roots above ground form to the rapid flow-off of the surface water, by forcing it to remain stagnant in a thin sheet, instead of accumulating in a mass and running off quickly in the shape of brooks, which is what happens where the surface water finds little obstruction and is apt to produce erosion. To this may be added, in the case of cold climates, the additional advantage that the snow lies longer in the forest and melts here more slowly than in the open country. To conclude, forests act as real regulators, obliging the rain water to flow much more slowly to the bottom of the valley, than it would do otherwise, and by this means ensuring a more uniform and continuous flow in the lower reaches of rivers.

But, as already stated, opinions differ widely the moment we approach the subject of phenomena which are apt to produce heavy and extraordinary floods. Some of the authors (Messrs. Ponti, Keller, and Wolf-schutz) assert with insistence that heavy floods are due entirely to climacteric causes and that, consequently, the influence of forests is nil, or at any rate so small, that it can be neglected altogether. The reasoning by which they arrive at this conclusion is as follows: These great and extraordinary floods, they assert, only occur after down-pours lasting several days; hence, under similar circumstances, we must take it for granted that the leaves and all other parts of the plants have already soaked up the maximum quantity of water they are able to retain, that the upper layer of the soil

*This translation is not mine.

is completely saturated and that the surface waters have already reached the bottom of the valley, when it is still raining in the more elevated and more distant parts of the catchment area. Under these circumstances, they maintain, the volume of water which comes down as rain is equal to the volume of water which flows to the bottom of the valley in the same time; in other words, the moderating influence of forests—like that of lakes and every other agency of this kind—tends to fall off with increasing length of time, while the phenomena lasts until finally a point is reached when the efficiency becomes nil. Such is the fundamental argument of all these writers, and it does not appear to us that anybody has given them as yet a pertinent reply. Although I am only a reporter, I may be allowed to interpose in the question, because it does not appear to me that things happen exactly as they might appear. In the first place, I may remark that in order to arrive at such a necessary state of equilibrium, it is not enough, that the phenomenon should last for a sufficiently long period of time, but it is also necessary that the intensity of the phenomenon should also remain uniform during the whole period. Everybody will see, how during the same period partial compensation will take place, the outcome of which will be a tendency toward the average value of intensity, with an elimination of the greatest crises, which in itself is already a no mean advantage; but there is still more than this. By admitting that in consequence of the prolongation of the rain, a moment is at last reached when there is as much water coming down into the valley as there is coming down higher up in the catchment area in the form of rain, it still has to be proved—and, as a rule, this does not happen—that this state of equilibrium coincides exactly with the moment of the greatest intensity. In every instance in which I had to study phenomena of this kind in respect of lakes and floodings of valleys, I found that this period of equilibrium was reached invariably when the rain was abating, that is, when a falling off had already taken place in the intensity of the phenomena; in other words, that the phenomenon had reached its maximum degree of intensity before the moderating power had become exhausted, the latter having thus already made its beneficial influence felt at the most critical period.

If we next proceed to studying the question by the light of recorded facts, doubts arise and difficulties are met with, which are perhaps not less serious.

The advocates of the two opposite views have endeavored, by means of minute and most laborious researches, to get an insight into the past and to see whether it was possible or not to discover any difference in the regimen of great rivers for the past century, a period from which, generally, dates the deforestation carried out on a large

scale in Europe; but they always found themselves face to face with very serious difficulties, to which I will only allude briefly.

All records which refer to great floods in past centuries are always surrounded by so many uncertainties and doubts, that it is most difficult—not to say impossible—to draw any certain and indisputable conclusions therefrom. We have a striking example of this in the Tiber—a river after which the Nile is certainly the most historical of all—in the case of which it has been so far impossible to ascertain if its floods have undergone any change in the course of centuries.

Can the destruction of forests bring about a great deterioration and even the total loss of the layer of cultivated soil of cultivated lands, of those which are next to them, or lying beneath them, and, even further off, of the level portions of large valleys? Can it also cause landslips, landslides, and avalanches?

Upon this point it will be very much more easy for me to arrive at a conclusion *because the authors of the papers, without distinction, and all technical experts generally admit that the deforestation of sloping lands, especially if it is followed by a breaking up and cultivation of the soil, will cause the damages and injuries enumerated at the head of this chapter.*

Otherwise, it is easy to understand, and we are all daily witnesses of it, that when land with a sufficiently steep slope is deprived of the protection which roots of trees offer against erosion, and still worse, when the soil is subsequently broken up with plough or spade, the water, being able to flow off more quickly and to collect on a surface which offers but little resistance, can very easily remove and carry away with it to the bottom the earthy materials which form the cover, and leave the land denuded and barren. One can also easily understand that brooks, formed in this manner, can produce similar effects as regards laying bare the top of the slopes and carrying the material to the bottom of the incline, a place where the ground is better situated; and that the deep gullies, which similar small but impetuous, torrents scour upon the slopes of mountains and hills, can in their turn also cause the landslides and falls, especially if the underlying rock is of a soft and friable nature, and is, therefore, liable to being washed away easily. It is equally evident that on a slope, which is denuded of trees, avalanches are more likely to occur and will be more destructive than on a forest-clad hill, no matter how steep the incline may be. The influence of deforestation on valleys, even when situated at a distance, though less apparent and obvious, is nevertheless equally certain and disastrous.

Professor Moore quotes from Colonel Chittenden's recent paper on the subject (pages 19 and 20). As I have

elsewhere reviewed this paper and pointed out the inconsistencies, contradictions, and purely arbitrary statements, presented without demonstration, which it contains, I will not further refer to it, but I will quote from Colonel Chittenden's report on reservoir sites in the arid regions, in which he says:

"The forests ought unquestionably to be preserved and the government is the proper agency to do it; but the principal arguments therefor apply with accentuated force to the construction of reservoirs."

Professor Moore says "army and civilian engineers and meteorologists generally believe that the broken, cultivated, permeable soil is equally as good a conservator of the rainfall as the forest area itself." Here again Professor Moore obscures the point of this subject by talking about cultivated areas, although he knows perfectly well that his paper would be used as an argument against the preservation of forests on the steep slopes not suitable for cultivation. I protest against such misrepresentations in the discussion of an important measure. As a matter of fact, the only references in the reports of the Chief of Engineers to this subject which I have been able to find, are the following:

In the report for 1875, Vol. 2, page 172, reference is made to the paper of Wex, a prominent Austrian engineer, who wrote an elaborate argument in favor of the proposition that forests exercise an important regulative influence, and the statement is made by S. T. Abert, United States Assistant Engineer:

"This decrease is assigned to the devastation of the forests and the consequent decrease of atmospheric moisture—a cause often assigned but not yet demonstrated. * * * But whatever may be the causes operating, there can be little doubt as to the effect of the sediment brought down by the annual rainfloods."

On page 510 of the same report, Maj. Charles R. Suter, then in charge of the improvements on the Mississippi

River, says: "The influx of sand *from above* must first be stopped; then the river will have a chance to clear itself, and as its width contracts the shores can be revetted to prevent any further injurious changes."

In the report for 1879, page 1211, Maj. Charles O. Allen says: "The weight of evidence collected by various writers upon the subject of rainfall seems to indicate that reforestation of extensive areas of country is followed by a more equable distribution of the rainfall throughout the year."

In the same report, page 1373, Assistant Engineer T. P. Roberts says: "The clearing of forest lands, I believe, is followed by greater fluctuations in our rivers. I think the storm-waters undoubtedly reach the streams more rapidly now than formerly."

And in the report for 1891, page 1107, Maj. Charles W. Raymond, one of the most scholarly and capable officers who has ever been connected with the corps, makes the following forcible statement, which it may be well to quote in full:

CAUSES WHICH INCREASE THE DESTRUCTIVE EFFECT OF FLOODS

Such causes may be considered under the three following heads:

1. Destruction of forests and cultivation of land.
2. Artificial constructions, such as bridges and dams.
3. Collection of logs, lumber, and ice in the stream and upon its banks.

1. *The destruction of forests from the mountain crests and slopes of a watershed is undoubtedly the principal cause of the increase of the average magnitude of floods.** The evidence collected during the last twenty-five years establishing this conclusion is *well-nigh overwhelming*, and it is verified by repeated observations, not only in the mountains of Europe, but also in our own land. By the removal of the forests from the mountain slopes the ground is robbed of its protecting covering of roots, moss, leaves, and porous soil, which forms the forest floor and serves as a natural storage reservoir, holding back the water of rainfall and melting snow, and compelling it to descend slowly to the channels. By the subsequent cultivation of the lands, ditches and drains are made to facilitate the more rapid discharge from

the cultivated surfaces, until the rain rushes down the hillsides in destructive torrents, gullyng the ground and choking the minor lines of drainage with rocks, sand, and gravel, and hurrying into the recipient of the watershed volumes of water which before reached it in a comparatively quiet flow.

Colonel Torrelli affirms as the result of careful observations that four-fifths of the precipitation in forests is absorbed by the soil or detained by the surface of the ground, to be gradually given up in springs and gentle rills, and only one-fifth of the precipitation is delivered to the rivers rapidly enough to create floods. Upon the same slopes and surfaces denuded of their forests, the proportions are reversed.

That the destruction of the forests in mountainous watersheds is followed by disastrous floods where previously such floods were unknown is not a matter of theory, opinion, or probability, but it is a well-established physical fact.

* * * The method of prevention by the maintenance and planting of forests upon the headwaters and upper slopes of the affluents of the basin depends for its efficiency upon the ability of forest-covered slopes to retain for a considerable time a large percentage of heavy rainfall, thereby preventing the surcharge of the lines of drainage. *In France, Italy, Germany, and Austria the systematic planting of mountain slopes as a means of restoring lost fertility and preventing the inundations following the destruction of forests, is an established fact followed by results more satisfactory than the most sanguine anticipations.*

*The following information with reference to the deforesting of the watershed of the West Branch of the Susquehanna was received after the completion of this report:

Lumbering operations were commenced in this region in 1850, but no systematic record of the amounts cut was kept until 1862. In the latter year the cut was 38,000,000 feet board-measure. It rapidly increased until it attained its maximum of 319,000,000 feet in 1873, and then fell to about 212,000,000 feet in 1890. The total amount cut since 1862 is about 5,250,000,000 feet board-measure, which represents about 30,100,000 logs.

In the year 1880 the timber on nearly 700,000 acres of land in Pennsylvania was destroyed by fire.

The above statements are based on the census report for 1880, and on information furnished by Mr. George S. Banger, Secretary of the Susquehanna Boom Company.

There is at least one officer of the United States Corps of Engineers who is acquainted with the teachings of experience.

Colonel Chittenden himself, the officer who has most recently written on the subject, apparently believes that the sediment carried by the Mississippi River into the Gulf of Mexico comes entirely from the mountain areas at the sources of the tributaries, for he says:

"It must be clear from the foregoing that the bottom-lands of the Missouri add nothing whatever to the total quantity of sediment that passes out of the mouth of the stream, for these bottoms have been increasing rather than diminishing in quantity. Likewise, the Mississippi bottoms contribute nothing to the volume of sediment that is carried into the Gulf of Mexico. It all comes from the uplands far and near, but principally from the more remote and hilly regions. This load is in the nature of through traffic. The local freight picked up from a caving bank is mostly discharged at the next station. It follows, therefore, that if the banks of these streams were revetted from the Gulf to Pittsburg, the Falls of St. Anthony, and the mouth of the Yellowstone, the quantity of sediment passing into the Gulf would not be diminished a particle."

In my previous discussion of Colonel Chittenden's paper, I have shown, I think, the incorrectness of this statement. Any sediment washed into a river, whether from the uplands or from the banks in the lower portions, is gradually carried downstream and adds to the total volume of earthy matter that is being transported or moved by successive floods. But the point is, as indicated in the extract from Major Suter's report (and this is perhaps what Colonel Chittenden means) that unless the influx of the earthy material from the uplands and mountain slopes above the navigable portions is prevented, the protection of the banks along the lower navigable portions will not be sufficient to maintain the navigation, because the channel will be gradually filled up by this sediment coming from above. As Major Suter says: "The influx of material from above must first be stopped."

EROSION

The most important question connected with this whole matter is the effect of the forests on erosion, which has been already incidentally referred to. This matter Professor Moore passes over with astonishing silence, and if it was his intention to offer a scientific contribution to the subject of the effect of forests, it is difficult to understand his reticence on this point. The fundamental principle is self-evident. The surface water running off from forest ground takes less earthy matter with it than the surface water from bare ground, from partially wooded ground, from grass land, or from cultivated land, especially on steep slopes. Land partially grown up in forest or bushes, or grass land, is of course better than cultivated land in this respect, but neither is anything like as effective as forest land. Forests, therefore, are the most efficient protection of the ground against erosion, and this is the strongest argument in favor of their preservation on steep slopes.

In his argument before the Committee on Agriculture, March 1st, Professor Moore stated that erosion was "a beneficent action." In his published paper, however, only about half a page has been devoted to this important subject as against fourteen pages to the entirely unimportant subject of the effect of forests on rainfall! In his paper he again befogs the issue on this point by bringing forward the argument that "every acre that will grow food for the people and thereby reduce its cost and furnish sustenance to the population and the teeming millions that are on their way to these shores, should be so employed." In other words, again "the pleading of the poor man's children for bread and meat" is allowed to stand in the way of the fair discussion of a great public policy.

Everybody knows that streams that flow from forested mountain areas are comparatively clear, while streams which flow from bare ground are comparatively muddy, and the efficiency of forests in preventing erosion of the

ground is admitted by all competent authorities.

First in importance, then, is the effect of forests in preventing erosion; second is their effect in moderating; in general, the violence of floods and in maintaining a high low-water stage, and least or insignificant in importance is their effect upon climate.

RATIO OF MOUNTAIN WATERSHEDS TO THE TOTAL WATERSHED

Another claim put forward by Professor Moore is that the ratio of the mountain watershed in a large basin like that of the Ohio River, is so small that the reforestation of the mountain area will be of little benefit. A brief examination will show the fallacy of this and the unfairness of Professor Moore's reasoning, and to make this clear it will be necessary here to explain, briefly, the cause and action of a flood.

The fundamental cause of the flood, of course, as every one admits, is excessive and long continued precipitation over a large area. The rain which falls on the mountain sides is gathered rapidly into the brooks and larger streams, but much more rapidly from bare areas than from forested areas, and carrying much more sediment. The transporting power of water varies about as the sixth power of the velocity; that is to say, if we double the velocity of flowing water it can move a cubical particle of rock or earthy matter sixty-four times as large as before. The waters come down from bare hill-sides, therefore carrying large masses of sediment, and as the waters reach the upper navigable portions of the streams where the slope is flattened, they gradually deposit their sediment. Succeeding floods carry portions of this sediment further down, and so it gradually reaches—perhaps only after a considerable length of time—the lower reaches of the river. The immediate effect of deforestation on floods and on the deposition of sediment will clearly be felt first in the upper reaches of the streams; on the Ohio River, for instance, at Pittsburg and points above, rather than at Cincinnati, Cairo, Mem-

phis or New Orleans. It is hardly fair, therefore, as Professor Moore does, to compare the *mountain* watershed of the Ohio River with the *entire* drainage area of that stream. The mountain watershed is more fairly to be compared with the drainage area above Pittsburg, of which it would form a considerable proportion.

The sediment brought down by the mountain stream is, in the course of years, washed farther and farther down the river, and that carried in suspension is gradually deposited, as the slope becomes less and the velocity of the flowing water correspondingly less, in the bed of the stream. Subsequent floods find therefore a smaller channel in which to flow, the bed of the river having been raised by sediment brought down by previous floods. The floods, therefore, in the lower reaches, finding the channel contracted, are obliged to rise higher and to overflow bottom lands, and in doing so they wash away the banks where these are alluvial, causing still more material to be swept into the channel of the river. At the same time, some of the sediment from above is deposited over the bottom lands.

Now, the point is—and it may as well be once more emphasized—that even if the banks in these lower portions were protected against washing away, the gradual filling up of the channel of the stream by sediment brought down from above would in itself cause the floods to rise higher and higher as the years go by, and to overflow larger and larger areas. Once more to quote Major Suter and Colonel Chittenden, “the influx of sand from above must first be stopped.”

To estimate, therefore, the value of the forests in preventing erosion, it is grossly incorrect to compare the mountainous area with the *total* area of a large drainage basin. If we could protect the mountain sides, and limit the erosion to what would naturally come from flat, cultivated land, and from caving banks, the problem would be

comparatively easy; and it should further be noted that the erosion from flat, cultivated lands can be largely prevented by proper methods of cultivation and plowing, which will not allow the water to flow with great velocity through the furrows. Plowing should be done not up and down the slopes, but along the contours. Land suitable for cultivation should be used for cultivation if necessary, but there is nothing in all this discussion of Professor Moore's which casts a shadow of doubt on the efficacy of the mountain forests as conservators of the navigability of streams.

Before leaving this subject, it may be as well to say that probably the best authorities upon it are neither meteorologists nor engineers in general practice, but foresters and forest engineers, and that these are practically, if not quite, unanimous as to the value of forests. An engineer whose duty it is to maintain harbors and the navigable portions of streams, like the officers of our Corps of Engineers, does not, in the course of his daily experience, have much opportunity to observe or study forest questions. He sees banks cave and the material form a bar below; he does not see the constantly-moving mass of sediment in the bottom of the stream; he does not see the erosion on the mountain slopes; out of sight is out of mind, and he may easily fail to recognize the importance of what he does not observe. Professor Moore admitted that he had never studied erosion in the mountains, and yet he presents a paper which dismisses this most important element in less than one page and which is offered as a presumably weighty contribution to a great subject!

A volume could be filled with quotations from the writings of those who have observed this matter, but as an illustration only one will be given from a review of a work published in 1901 on “Forestry in British India,” by Berthold Ribbentrop, who has spent thirty-four years in the forest service.

Statements like this should overbalance a thousand statement like those in the paper we are considering:

In the Hoshiarpur district of the Punjab the Siwalik range of hills stretches from the Bias to the Sutlej River in a southeasterly direction. These hills consist of a very soft friable sandstone, alternating with strata of loam and clay. Formerly these hills were fairly well wooded. In 1846 they became British territory; the consequence was a rapid increase of population, a great demand for wood and charcoal in the fertile plains below, and the influx of a floating population of graziers with large herds of cattle. The result was complete denudation of these hills; the loose soil, no longer protected by vegetation, was washed down, broad rivers of sand spread into the plains below, and the end has been that fields and gardens of 940 villages, once prosperous, are now covered with sand, which has laid waste upward of 70,000 acres of fertile lands. This district, rich formerly, is now traversed by numerous broad, parallel sandy belts, cut out of the fertile and crop-bearing area.

Efficient protection of the reserved forests was only commenced a comparatively short time ago, and yet the author is able to state numerous instances from different parts of the country, in which protection has completely changed the character of the torrents and streams taking their rise in the forests. After rain, the water no longer rushes down, carrying sand and silt with it; the channels have been confined into permanent beds; they have become narrower and deeper, and the old beds to the edge of the channel have become stocked with grass and thousands of seedlings. * * * The denser vegetation, which is the result of efficient protection, has everywhere counteracted erosion, has prevented landslips and sudden floods.*

ARE FLOODS INCREASING

Professor Moore devoted thirteen pages of his thirty-six to the discussion of this matter, in which he criticised the discussion of Mr. Leighton of the Geological Survey, and of Messrs. Hall and Maxwell of the Forest Service. His objections to these two papers are the following:

First: He claims that they discuss "not floods as such, but moderate stages of the river."

Second: He maintains that their method of discussing the observations is incorrect.

I have not at my disposal the records bearing upon this matter and therefore

cannot, even were it desirable, here discuss them in full. Mr. Leighton's discussion of the Tennessee River compares the conditions existing in the twelve years 1884 to 1895 with those existing in the twelve years 1896 to 1907. Professor Moore admits that this period of time is too small to allow of definite conclusions being drawn. He further says that "no records or other evidence are presented that there is not as much forest area in this basin as there was twelve years ago." The most that can be said, therefore, with reference to this discussion is that the evidence is not sufficient to justify definite conclusions either way. Personally, I think the figures given by Mr. Leighton indicate an increase in floods, but not having the full data at hand, and particularly data as to the forested area, I believe this is simply another illustration of the fact that the statistical method is of very limited use, and perhaps of no use at all, in the case of meteorological and hydrological phenomena covering so short a period of time. Professor Moore apparently takes the same view, for he says: "No matter how complete the data may be or how fundamentally sound and fair its collation and grouping, the comparison, the one with the other, of such short periods as those measured by only twelve years cannot give results with regard to changes in climate and floods that will permit the most skilled meteorologist or engineer to draw fundamental conclusions that can have any value."

If Professor Moore had stopped here we could agree with him on this point. Unfortunately, however, he goes on to give what he considers a different and more reliable form of investigating this question of the relation of precipitation to run-off. For this purpose he takes the records of the height of the Ohio River at Cincinnati from 1871 to 1908, and from a consideration of these results he draws the following definite conclusions: (p. 33)

"The average discharge of the Ohio River where, I *presume*, deforestation has been as great as in any other part of the country during recent times, has not changed for a period of thirty-eight

**Nature*, April 18, 1901.

years except as caused by precipitation." He draws this conclusion from the following facts:

Average stage of the Ohio River at Cincinnati, Ohio,

	Ft.
1871-1889	17.3
1890-1908	17.5

Average precipitation in the Ohio watershed:

	In.
1871-1889	41.3
1890-1908	41.8

Professor Moore is apparently willing to draw definite conclusions from insufficient data where this data indicates to him that forests have no effect. He criticizes others for drawing definite conclusions where the reverse is indicated. Only on page 28 he has made the remark, which is perfectly correct, that: "Precisely the same amount of rain falling in the two periods and no change whatever in forest or cultivated area, might produce largely differing results on floods;" and yet, because the average stage of the Ohio River in the two periods corresponds, in general, with the average precipitation, he concludes that "the average discharge has not changed *except as caused by precipitation*."

Now, the fact is, that Professor Moore's figures give no indication whatever of the discharge of the river. He is evidently ignorant of the fact that a given river at a given place, when the water stands at a certain height on the gauge, may be discharging much more or much less than it may be discharging at another time when the water stands at precisely the same height. Readings of gauge heights are very inaccurate indications of discharge. The discharge of a stream depends not upon the gauge-height alone, but also upon the *slope of the surface of the water*, not upon the slope of the bed of the stream. A channel may have a level bed for a mile, but if the depth of the water at one end of the distance is

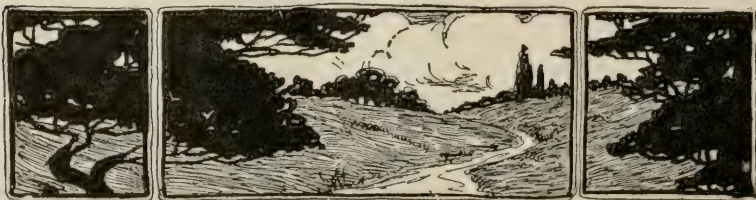
greater than the depth at the other end, there will be a rate of discharge, depending upon the slope of the surface as well as the depths. On the other hand, if the bed of the stream is inclined, but the water surface level, so that the depth is different at the two ends, there will be no discharge. When a flood wave comes down a river, the front of the wave is steeper than the back, and when the water reaches a given height on a given gauge, and is rising—that is, when the front of the wave is passing, the slope of the surface of the water will be greater and the discharge greater than when the crest of the wave has passed and the water stands at the same height on the gauge as before. It is, therefore, fundamentally wrong to draw any definite conclusion with reference to the *flow of a river* merely from observations of the gauge-heights. It is equally incorrect, as Professor Moore does, to draw any conclusions with reference to the increase in number and violence of floods from the number of days at which a river stood above a certain stage. In his testimony before the Agricultural Committee, Professor Moore, when confronted with these facts, said that it made no difference whether the discharge was measured by a gauge-height or not, flood conditions were to be determined by the number of days at which the water stood above a certain height.

Now, let us suppose that from 1865 to 1885 on a given stream, there were forty floods in which the water stood above a given gauge-height at a given place, an average of four days for each flood, or 160 days in all; and that between 1885 and 1905 there were eighty floods in which the water at the same place stood above the same height an average of two days each, or 160 days in all, the same as before. According to Professor Moore's discussion, the conclusion would be that the floods were not increasing because the total number of days at which the water stood above a given height had not changed!

I think it will be clear from the above remarks that Professor Moore's figures prove nothing whatever. As a matter of fact, the effect of the removal of forests, (reasoning now deductively) is unquestionably to increase the suddenness with which the flood waters are gathered into the streams. It is therefore fair to believe that such deforestation increases the number and suddenness of floods, diminishing also their duration. The damage done by floods clearly does not depend simply upon the number of days of flood. If an area is partly submerged it makes comparatively little difference whether the submergence lasts four days or ten days, the damage is not thereby increased perceptibly; but if, after one flood has subsided, there comes another one after an interval of a few months or a few years, although both may be short, the damage will be approximately doubled.

Other points in Professor Moore's paper might be criticised, but this discussion is already too long, and they will be passed over. It is much to be regretted that the head of a presumably scientific department of the government should, while claiming to be in favor of forest preservation, have produced such a paper as the one under consideration, the influence of which—so far as it has any influence—would be to discredit action which, as already stated, depends for its legality upon the effect of forests on the navigability of streams. Professor Moore's paper, in which he practically leaves out of account entirely the question of erosion, which is the most important one of all; in which he at-

tempts to prove that on certain streams there has in recent years been no increase in floods, but in connection with which discussion he offers no figures regarding the decrease or increase in forested area, and on which, as has been shown, his argument is in many respects unscientific and proves nothing; and in which he devotes a large amount of space to the entirely unimportant question of the effect of forests on rainfall, the general effect of which is to lead the mind to the conclusion which may have been desired, but which certainly has not been proved, that forests are of little value as regulators of flow, is much to be deplored. The matter is one of national importance and simply involves the question whether we shall learn by the experience of other countries, in which deforestation of mountain areas has resulted disastrously, or whether, with the rapidly increasing demand for wood, we are to allow our mountain forests to be rapidly destroyed. The beneficial effect of such forests on the navigability of streams, is, as has been shown, unanimously agreed upon by foreign engineers, although of course, no one attempts to state that effect quantitatively. There is, therefore, ample scientific justification for the acquirement by our government of forest reserves in the East. The fact that there are many other reasons why such forests should be preserved, some of which may be stronger than the beneficial effect of forests on navigation, is certainly no reason for neglecting to take action whose legality is amply justified by experience.



CLASSIFICATION OF WOODS BY STRUCTURAL CHARACTERS

By C. D. MELL, Assistant Dendrologist, Forest Service

INTRODUCTION

THE study of wood for the purpose of finding structural characters, on which to base a classification is still in its infancy. No one has published anything comprehensive on the subject, although it is pretty generally recognized that an intimate knowledge of woods is one of the utmost practical importance. The principal contributions to this branch of dendrology have been made by students of botany in the German universities where all technical investigations are greatly encouraged. Since the introduction of forestry into this country a good part of this information has been translated into English directly by those familiar with German. Much has been contributed in this way to the English literature of the subject. Books on the botanical characters of American trees are being constantly written, but up to the present time no one has written a work on the structural characters of the wood, with which the forester should be quite as familiar as with the characters of the leaf, flower, and fruit. Ever since timber has been bought and sold dealers have been relying on the "rule of thumb" method for discriminating between woods. This method is sufficiently reliable for the carpenter or the timber merchant, for he deals with only a few kinds of woods and a knowledge of their general properties is easily gained through the senses of sight, touch, smell, and taste. Anyone who constantly works with certain woods can easily distinguish them by their most obvious characters. A new wood, however, will leave him entirely at sea, nor will his method suffice for the forester who deals with a good many different species. It is necessary,

therefore, to have much wider information, methodically arranged, to help out the rule of thumb method.

LITERATURE DEALING WITH WOOD STRUCTURE

Unfortunately there are no English publications that contain a scheme of classification for even a single group of woods. J. S. Gamble's "Indian Timbers" is a most excellent work, but it does not give very definite information helpful in identifying the timbers of India from their structural characters. Gamble does not attempt to point out the chief features even of the most important woods. Sir Dietrich Brandis' book on "Indian Timbers" is the best descriptive English work. Although this work is the most authoritative of its kind, the author has taken more pains to give the botanical characters than to point out the chief distinctive features of the woods themselves. Thomas Laslett's "Timber and Timber Trees, Native and Foreign," does not contain anything that approaches a key even to the most important kinds. Dr. Marshall Ward's book dealing with timber and some of its diseases contains some very helpful suggestions relative to the importance of a scheme of classification. Herbert Stone's works, chief of which is "The Timbers of Commerce," are among the latest books dealing with the structural characters of commercial woods. His "Timbers of Commerce" is also very helpful both to the forester and the timber merchant, but it lacks a discussion of the structural characters. Dr. G. S. Boulger's book entitled "Wood" (last edition) is an excellent work and

contains a key to some of the European woods. The author does not give a great deal of original matter in this book; the analytical key appears to be chiefly from Dr. Robert Hartig's "Timbers and How to Know Them."

Students of wood structure in America are less numerous. Chief among those who have done original research is Dr. D. P. Penhallow, whose labors on the North American Gymnosperms extend over a period of twenty years. He is easily the greatest living authority on the anatomical characters of the North American Gymnosperms. Romeyn B. Hough's sections of woods deserve praise, for they offer the named wood itself for comparison which lends much assistance to dealers in American woods. Among others who have done work along this line are Roth of Michigan University, Jeffery of Harvard University, Sudworth of the United States Forest Service, Toumey of Yale University, and Snow of New York University.

It is to the Germans that we must look for substantial progress in this work, and chief among them is Radlkofer and the botanists of his school. Dr. Hans Solereder worked out a classification based on purely morphological characters. Unfortunately, however, he confined himself to the examination of small twigs, and consequently included characters that belong only to primary wood, which yields few characters present in market samples that consist wholly of secondary wood. Nordlinger has briefly described 1,100 species from small transverse sections. A number of these sections, however, as is true also of Solereder's, are taken from small twigs which do not show structures characteristic of secondary wood. Nordlinger did not make a key for tracing down the woods to the group to which they belong. Although a number of German botanists have confined their attention to particular groups of woods, they have accomplished a great deal of good. Among them are Abromeit on the Cupuliferæ; Beyer on the Anonaceæ; Burgerstein on the Pomaceæ; Dippel and Mayr on the

Coniferæ; Goppert on the Magnoliaceæ; Hitzemann on the Dipterocarpaceæ and Chloenaceæ; Jaensch and Saupe on the Leguminaceæ; Knoblauch on the Laurinaceæ; Moll, Janssonius, Reinsch, Schroder, Schwartz, Springer, etc. Altogether a great deal has been done by the different investigators toward making a key based on the anatomical characters found in wood. If the knowledge now accumulated in English and German publications could be simply compiled a very valuable work would be done.

THE IMPORTANCE OF MICROSCOPICAL RESEARCH

An investigation of this kind has always been considered one of great importance, and it does not require any extended defense. What is needed is simply the collection and determination of special, well-chosen structures, so recorded that they may be readily referred to when needed.

If only a few objects are to be classified it may not be necessary to compile very many distinguishing characters, but when the objects run up into the thousands it becomes necessary that the characters employed in a key be multiplied accordingly. The required number of characters can not be determined by the unaided eye or even with a hand lens; on the contrary it may require the closest observation with the highest power of the compound microscope in order to detect a sufficient number of constant characters. Objections have been, and may well be, raised against such microscopical research on the ground that the results will be too technical to be useful to the mass of wood users most in need of a key. English timber merchants have tried for many years to prepare a key based on the more obvious gross characters for the reason that they are not equipped to make a microscopical examination of woods. The time has arrived, however, when the number of foreign woods in general use is becoming so great that a knowledge of the gross characters alone will no longer answer as means of iden-

tification. Purposely or through ignorance, importers appear constantly to be endeavoring to palm off upon their customers substitute woods, sometimes inferior, whose superficial appearance is close enough to deceive the uninitiated. The real mahogany, *Swietenia mahoganii* is now becoming scarce, and at least a score of different woods from Central and South America, India, Africa, and the Philippine Islands, are being sold as the "only genuine mahogany." The Australian eucalyptus and a number of other woods are being so skillfully stained to imitate ebony that no one except an expert can distinguish the counterfeit.

Dr. Schlich once remarked that as the timber supply declined in the northern hemisphere another suitable source of supply must be looked for in the southern hemisphere. The demand for different woods and the growing scarcity of the most useful kinds in this country forces us to go to the tropical countries of the southern hemisphere for millions of feet annually. The foreign woods now in general use are too numerous to be distinguished by superficial characters. We must look to minute structural characters as a means of tracing down woods with which we are not familiar. For this, recourse must be had to the microscope. The result of such investigations are far reaching in usefulness, including the needs of the forester, lumberman, and timber merchant, and even of the pharmacist. There are numerous medicinal properties derived from different woods, and it is very important in their preparation that the right kind of wood be used. There are certain woods, for instance, that resemble quassia in external appearances. In order to detect the numerous attempted uses of these as substitutes or adulterants of genuine quassia, it is necessary to know the microscopical characters of quassia to distinguish the real from the spurious wood.

Work of this character is primarily technical, but it does not aim to replace

entirely nor to underrate the old rule of thumb method. Attention is drawn only to the necessity for more scientific investigations of woods and the compilation of existing expert knowledge as a means of meeting the needs of technical institutions and of private persons possessed of the training and equipment to make use of such help. It is not implied by this that the more obvious characters of woods seen in the block should not form part of the natural system so far as they can be made to serve. Such characters of wood, as color, weight, hardness, and odor, often help in making determinations. So also color solutions, obtained by boiling the wood in water, acid, alkali, iron salts, or glycerine, yield very valuable and interesting data. Even burning tests are often helpful in discriminating between woods. For example, the eucalypt Jarrah always burns to a black ash, while Karri, another species, burns to a white ash. The importance of such characteristics can not be too greatly emphasized.

Since systematic botanists generally have no special concern in the identification of woods, it is a task that naturally devolves upon the foresters who are professionally interested in the uses of this and other forest products. The field is so large and all-absorbing as to require specialization apart entirely from other branches of technical forestry. It requires a specialist trained not only as a lignologist, but also as a botanist. Moreover work of this character requires a most sedulous investigator with one aim, the good of the work.

Such a work as this has fitly become, with other dendrological investigations, a most important economic study in the Forest Service of the United States Department of Agriculture. The results, which are being very rapidly put into shape for publication, are practical aids to practical manufacturers and users of woods, as well as to other students of trees and other products.

PROTEST AGAINST THE WOODSMEN OF THE FOREST OF GASTINE

By PIERRE DE RONSARD (1524-1581)

Translated by Bristow Adams

[This poem by Pierre de Ronsard is historically interesting, since it shows a sentiment for forest preservation in France in the middle of the sixteenth century. France has suffered greatly from forest destruction, and in recent years has been at great pains and expense to repair the damage. The naive philosophy of the last two stanzas is somewhat prophetic, as poetry often is, of the changes to earth forms that may, and do, come about through forest destruction and its attendant evils. The poem is, of course, far from the modern spirit. The original meter and rhyme-scheme have been retained. B. A.]

Ah, woodsman hold! Stay thy destroying arm;
These are not trees that thou dost bring to harm.
Dost thou not see the blood that trickles dark
From veins of nymphs that dwell beneath the bark.
If murderers deserve the stake, the rope,
How much less thou shouldst ever dare to hope
For mercy from such punishments as these,—
For thou art killing our divinities.

O, forest home in which the song-birds dwell!
The squirrel and the stag shall miss the spell
Of thy cool depths when summer's sun assails,
Nor more find shelter in thy shadowed vales.

No longer will the love-lorn shepherd lean
Against thy trunks; nor will his pipes shrill keen—
His dog at heel, his crook beside him set—
The tale of love he bears the fair Janet.
All will be silent; Echo will be dead;
A field will lie where shifting shadows fled
Across the ground. The mattock and the plow
Will take the place of Pan and Satyr now.
The timid deer, the spotted fawns at play
From thy retreats will all be driven away.

Farewell, old woods where Zephyr played so free;
Where first I turned my soul to poesy;
Where first I heard Apollo's arrows whirr;
Where first I heard my better impulse stir;
Where first I met Calliope divine,
And through her learned to know the Muses nine.
Their wreaths of roses on my brow were pressed
The while Euterpe held me to her breast.

Farewell, old forest, sacred crowns farewell!
Revered in letters and in art as well
Thy place becomes the scorn of everyone,
Doomed now to burn beneath the summer sun.
All cry out insults as they pass thee by,
Upon the men who caused thee thus to die!

Farewell, old oaks, that once were wont to crown
 For deeds of valor and of great renown!
 O trees of Jupiter, Dordona's grove,
 How ingrate man repays thy treasure trove
 That first gave food, that human-kind might eat,
 And furnished shelter from the storm and heat.

Ah, how unhappy he, that pins his faith
 In forms that will but vanish as a wraith;
 How true it is that everything must change,
 And take on habits that are new and strange!

The peaks of Athos shall in plains be lost;
 The Vale of Tempe to a mount be tossed;
 Where Neptune rules shall all be sowed to grains;
 All form is lost; matter alone remains.

CORRESPONDENCE AND QUERIES

Natural Checks to Distribution of White Pine

The Editor of American Forestry:

While studying charts of distribution of certain species of conifer, I could see no reason why the white pine (*P. strobus*) should not occur indigenously in abundance near my country place at Stamford and Greenwich, Conn. There was no natural check in evidence, and I proceeded to set out several thousand of these trees, along with other conifers seven years ago. Every year since that time more white pine have been added, but it is apparent that the species cannot be expected to thrive in this region, which the charts show is normally favorable. My loss amounted to something like 10,000 white pines, varying in age from two years to ten years at the time of transplantation. These trees came from various nurseries, and some were raised from seed in my own nursery. Some were common seedlings, others were stock "transplants," and the larger ones were chiefly shipped from nurseries, with balls of earth about the roots of the trees. A few hundred trees were lost in ordinary ways—girdled by rabbits and field mice, terminal buds eaten by red squirrels and roots eaten by pine mice, but the sweeping destruction has been caused by the white, wooly aphid and by another aphid which I have not classified. The latter

is not so abundant as the white aphid, but it multiplies on individual trees so rapidly that the tree is more quickly destroyed. It is a small, dark-colored aphid which runs nearly as rapidly as the ant guardians when disturbed. The only white pine trees that I have been able to save are a few that have received constant supervision on the part of my superintendent, who personally wipes every infected area of bark with a sponge soaked in a decoction of Persian insect powder. He goes over each infected tree several times in the course of a season, and will not allow any of my other employes to take the responsibility of caring for the few living white pines. Tobacco stems are used for mulch about the roots of these trees. Trees which have been lost by the thousand were set in all sorts of soil,—swamps, sand, rocky cliffs and rich cultivated ground. All shared the same fate, in a general area something more than a mile in length. Here and there in the neighborhood, on other properties, a very few white pines are seen, but it is my feeling that this region is unfavorable for white pine, not because of soil or climate, but because the two species of aphid have been indigenous to the locality, and have always served as a natural check to distribution of this species of pine.

ROBERT T. MORRIS.
 New York.



EDITORIAL

The Weeks Bill Reported

AS FORESHADOWED in the pages of this magazine last month, the Committee on Agriculture of the House of Representatives voted to report the Weeks bill for the purchase of national forest land. The vote in the committee was ten to seven in favor of so reporting. Chairman Scott, Mr. Haugen of Iowa, Mr. Hawley of Oregon, Mr. Howell of Utah, Mr. Chapman of Illinois, Mr. Beall of Texas, and Mr. Rucker of Missouri, voted against it as they have always done. Mr. Stanley of Kentucky, a good friend of the bill, was absent on account of illness, so that the actual poll of the committee on reporting the bill was eleven to seven. Two or three of those who voted for the report, however, reserved the right to take such action as they deem wise when the bill comes up in the House. The report for the majority of the committee was put in charge of Mr. Lever of South Carolina, and Mr. Plumley of Vermont.

Mr. Weeks has reintroduced his bill, with certain minor amendments that do not change in any respect the substance of the bill. This statement is made here to explain variations that may be found between the bill as it will be before the House and the copies of it that have been issued up to this time.

The bill is now before the people of the country for action. There will be a hard fight against it in the House and probably another in the Senate. The work of informing the people and their senators and representatives must, therefore, go on with increased thoroughness, for the bill must be passed at this session. A recent advice from New England says that "the condition

in the White Mountains is such that if the matter goes over to the short session it means grave and irreparable loss." We know that this is no idle word. The men who play with constitutional quibbles, or spend their time in considering engineering subtleties, should go up into the great woods among the hills and see what destruction is being wrought by man and the forces of nature that his work has let loose. One day of the real thing would be worth a week of arguments in committee rooms.

In the Sixtieth Congress, Mr. Weeks of Massachusetts and Mr. Lever of South Carolina were actively in charge of the bill in the committee. In the present Congress, Mr. Weeks is no longer a member of the Committee on Agriculture, though he retains his keen interest in this legislation and has personally prepared the bill which bears his name and which he will actively champion in the House. The work of managing the bill in the committee this year was borne by Mr. Lever of South Carolina, and the thanks of every friend of the Appalachian Mountains, north and south, are due to him for his earnest, painstaking, and capable work. He has made a thorough investigation of this subject, his efforts in its behalf have been a labor of love as well as duty, and his management so far has been most wise and successful. He has been ably assisted by Mr. Plumley of Vermont, a new member of the House and a new member of the committee, but one who has brought to the consideration of this subject a valuable knowledge of New England conditions and the legal acumen which long ago won him recognition as one of the foremost lawyers of his state. Friends of

forestry, and particularly of the Appalachian forests, have reason to be grateful that the place from which we miss the Hon. Kittredge Haskins has been filled by so able and so friendly a successor.



Not a One-man Cause

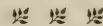
WE FIND in a somewhat lurid editorial comment on the Pinchot-Ballinger investigation this statement: "So far as this generation is concerned it now appears that that principle (conservation) will stand or fall with Gifford Pinchot."

To this we wish to take decided exception. It is worth noticing if only because it represents quite a widespread sentiment among admirers of Mr. Pinchot and one which we think does injustice to him as well as to the cause of which he has been one of the apostles and leaders. AMERICAN FORESTRY can not have left any doubt as to the extent and quality of its respect and regard for Gifford Pinchot, but the principle of which he has been one of the chief evangelists and organizers is greater than any man, nor is it praise for him to say that the government service which he built up from almost nothing is so weak that it will fall without his guidance, or that the cause that he is advocating so unselfishly and so brilliantly has no hold outside of his personality. The idea of forestry and conservation has become impressed upon the thought and convictions of the American people so thoroughly that it will be permanent. The truth is greater than any one man.

Nor does he stand alone. There were other wise men and prophets before him—men upon whose achievements his great work was builded, and most of them are still with us. They and he have given powerful inspiration to a generation of young men of faith and energy, and to a great body of people who have come to know the truth and have organized to main-

tain that truth. Nature is teaching the lesson from day to day so that he who runs may read. The minor incidents of legislative politics should not blind us to the real bigness of the issue and the tremendous power of facts. The removal of Mr. Pinchot from the Forest Service did not eliminate him. His technical defeat, if that should happen, in the congressional investigation in which he has played so prominent a part, will not change the popular conviction that he and the men who have fought for the salvation of the people's heritage from conversion to the personal profit of a few are right in principle—and that principle will hold its own.

If the law and the constitution do not protect the interests of those for whom they were created we shall still uphold the law and the constitution, but they will have to be made to serve the purpose for which they were created, and that was not to serve private interests or secure exclusive privileges to a few, but to promote the general welfare of the whole. We shall soon learn, if we do not already know it, that those words "the general welfare," at which the constitutional lawyers sometimes shy, are really the key note of the Constitution of the United States. We should repeat that pregnant phrase "government of the people, by the people, and for the people," until its meaning and spirit are indelibly printed on heart and brain. That is what we are slowly coming to—the comprehension of a great truth. Personalities are only incidental, great and valuable though they may be.



Pulp Wood Economies

THE article by Mr. Griffin on economic selection and processing of raw materials in the paper industry, published last month in AMERICAN FORESTRY, is suggestive of a great opportunity for economy in production that will sensibly promote the conservation of our forest resources. Mr. Griffin shows that the wide variation in the character

of paper products offers an opportunity for adaptation of the raw material which our manufacturers have not sufficiently availed themselves of. Therein also lies a reason for the failure of some of the fibres that have been proposed as a substitute for wood as a base for paper making. They have not been rightly applied. We believe that there is here a wide field for economy of the forests by the use of annual plants of rapid growth and that close study of its possibilities will be of advantage to paper makers and to the country in this age of disappearing forests. The late Edward Atkinson, the well-known Boston economist, instituted and was conducting at the time of his death experiments in the use for paper making of the tall grasses that are now grown wholly for ornamental purposes. Mr. Atkinson believed that he had found an easily grown new paper material, and he was one whose imagination always confined itself closely to the narrow path between the hedgerows of close-clipped facts. Since his death we have heard of no continuance of those experiments, but they were certainly worth while. Perhaps our resourceful Department of Agriculture might take them up.



A Western View

IN THE *Pueblo* (Colorado) *Chieftain* we find a notably fair and intelligent discussion of the question of conservation of western resources, which is entitled to careful consideration for it undoubtedly represents one of the best western points of view, while it comes from a part of the country from which we hear much intemperate and utterly prejudiced ranting against forestry and conservation. The article begins as follows:

The true friends of conservation in the west realize that they are confronted with danger on both sides. The opponents of the conservation policy in the western states are, for the most part, either men that seek to gain a selfish profit through a continuation of the policy of spoliation and monopoly, or men that are striving to score a

partisan point against the administration and the party in power.

On the other side, many of the advocates of conservation in the eastern states and some of those that are participating as officials in the institution of the conservation policy, have an avowed purpose to establish and maintain a great national domain which is to be administered for the benefit of the federal treasury and not for the individual benefit of the citizens of the states in which the national lands are situated.

With respect to the latter paragraph it may be suggested that the great national estate or domain already exists, and has existed since the Louisiana purchase and the Mexican cession, that it is the property of the whole people and that for reasons which the article we are quoting calls attention to in succeeding paragraphs, it should be administered for the benefit, not indeed of the federal treasury, but of the people of the United States. And this administration for the people of the United States will inure most directly to the benefit of the people of the western states in which this domain is located. The *Chieftain* continues:

Under such conditions it is important to recall what was the original purpose of the land laws, what have been their degrees of success, and in what particulars they have proved to be faulty or opposed to the public interests. The main purpose of the land laws was the disposition of the national resources, and primarily the agricultural lands, among individual holders. It was not regarded as good judgment to build up a great system of tenantry or to hold title to the national lands in the nation. The ideal condition was thought to be that of an agricultural population owning their own lands. That purpose is just as important now as it ever was, and no modification should be tolerated that tends to build up a great permanent national estate in mines, in forests or in agricultural lands.

With the main idea of this statement we are in cordial agreement, but in particulars it requires modification. It is perfectly true that there should be no building up of great national holdings of agricultural lands. It is for the interest of the nation, both east and west, that its agricultural lands should be divided in small holdings among individual resident owners. With regard to forest land, however, conditions are en-

tirely different. We have learned now that our national resources in forests are not inexhaustible and that the highest scientific skill must be used to foster the supply. There are large areas of land suited only for forest production and in no respect adapted to agricultural purposes which can add to the wealth of the nation only by growing forests. It is perfectly well understood that the growing of forests in these mountains offers too many difficulties for the private owner and will only be carried on by the state or the nation, and that if they are not so managed and controlled, they will fall into the hands of great corporations which will exploit them for immediate profit and thereby the permanent interests of the nation will suffer. And this suffering falls most on the people of those states in which the forests are situated, and which are necessarily the most direct beneficiaries of the many blessings the forests can bestow upon the people in whose territory they lie. The *Chieftain* goes on to admit this point and states the case very clearly.

But it has been a defect of the land laws that they have tended toward the creation of monopolies. This is not true of agricultural lands, because the nature of their use and occupation has made it difficult to keep large holdings in individual ownership, and the tendency has been rather to break up large holdings, where these existed, into smaller farms.

But with the mines and the forests the case has been different, and the mines and the forests and lands not suitable for farming have increased greatly in relative importance in recent years. This is especially true of the coal fields, of the oil fields, of the water powers, and of other resources that lend themselves easily to single ownership in large bodies and that increase rapidly in value without the expenditure of money for their maintenance or development.

The conservation movement owes its initiation and its strength to the knowledge that the national resources are in serious danger of waste, of depletion, of extortionate exploitation, and that the only remedy for these imminent dangers must be found in such a modification of the land laws as will give the people of the nation, acting through the government, power to protect themselves from these evils.

For many reasons the conservation movement might be better left in the hands of the state governments, rather than in the hands of the federal government, if it were not for the fact that in many cases the states themselves are held in the power of precisely the powers and influences against which it is necessary to guard the people's inheritance. In some western states it would be nothing more than a farce to turn the coal lands, the water powers and other resources over to the state legislatures for protection, when the majority of the members of those legislatures are customarily elected and controlled by the big corporations of those states.

That it is entirely possible to conserve the national resources in such a way as to prevent monopoly and at the same time to secure the original purpose of the land laws, is not a matter of doubt, for it has been demonstrated by the very effective work that has already been done.

The objects of the conservation movement ought to include a reasonable use and development of the national resources, and this use should be equally free from the extortions of a private monopoly and from the service charges of the federal government.

If by service charges of the federal government, the *Chieftain* means reasonable charges for use—for grazing, waterpowers, and so on—its view that such charges are improper is an incorrect one. The government, the federal treasury, are not things apart and served in and for themselves. The payments made for the use of the national domain are for the benefit of the whole people whose territory this is. Those who derive the direct benefits of use therefrom may fairly be expected to pay to the people a fair compensation for what they receive, as to any other owner. We are slowly outgrowing the idea that the nation through its government can recognize any favored class or individuals. This is a matter of simple democracy and equity and not tyranny, oppression or extortion. We think that this is where some of our western friends make their mistake. They went out to open a new country and everything was free and the work of the pioneer was deserving of reward. But the country has been built up and large expenditures are being made by the national government to develop it,

and these expenditures result in a special benefit to the people of the western states. They create rich prizes for the careless freebooters who throng a new country, and instead of giving away privileges it becomes necessary to guard them closely. Why then, should not the national domains provided for the people of the whole country and which are maintained by the people of the whole country, bear their fair share through those who use them of the expense incurred in their maintenance? The time is coming, undoubtedly, when the western forests will more than pay their own expenses and will yield a return to the national treasury. This is the experience of all countries which have a national forest policy; but at present they are a source of expense which all the states pay.

We have quoted the article from the *Chieftain* fully, with some notes of our own, because we feel that the writer and ourselves are not so far apart on the general principle and that we could very easily get together on the details. There has been too much sectional feeling and too little understanding of the west by the east and of the east by the west. Suppose we start from the fact that the east is not a great soulless banking corporation and that the west is not a wilderness to be exploited and work up to a conception of the United States as one nation, with common interests, a common faith, and a common hope. Some of our Denver critics are hopeless but we think that with our friend from Pueblo we might climb the heights.



The Cost of War and Peace

A STRIKING circular has been issued by the New York Peace Society showing the cost of armed peace to the people of the United States. In this circular several striking comparisons are made of the cost of the mainte-

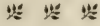
nance of our navy and the cost of many of the conservation enterprises which are proposed and upon the prosecution of which our legislators halt on the ground of extravagance.

For example, attention is called to the fact that the proposed White Mountain forest reserve could be purchased and planted for the cost of one battleship. This is too moderate a statement. The cost of one of the latest type of battleships now being built by the United States would very nearly finance for the next five years the whole proposed Appalachian forest enterprise. The cost of six or seven more battleships would pay for the great possible expenditure to which some believe this policy may lead and which so alarms Mr. Cannon and other watchdogs of the treasury.

But this is not the end of the story. In twenty-five years the Appalachian forests would pay the nation a good net return on the investment and they would increase in value, under proper forest management, from year to year, making a permanent addition to the national wealth. In twenty-five years the battleship would be fit only for the scrap heap, and during the period of its life its up-keep would have been a heavy expense to the nation.

In making this comparison, we do not need to enter into the question of the necessity of maintaining an adequate armament. The Peace Society made the comparison for one purpose—we make it to show that the nation that spends its millions annually for building new battleships that soon become obsolete and which will be useful only in the case of a problematical war, should not hesitate to make such investments as the proposed Appalachian legislation calls for for the sake of keeping its own house in order. The house owner who allows his property to go unpainted and without shingles and to fall into general disrepair, is regarded as incapable and as a poor business man. What shall be said of the nation that allows its property to run down from year to year? This we are

doing, and we have not the excuse of poverty or ignorance, for we have the example of other nations to guide us in the way of intelligent management.



The Growing of Eucalyptus

EUCALYPTUS growing in the southwest has assumed such considerable commercial importance that it is being exploited by numerous companies interested in selling lands for the purpose of growing trees. These enterprises when in reliable hands and under good management will probably have excellent prospects, and, as is always the case when some new investment field of this kind is being pushed to the front, it is necessary to guard against improper methods and incompetent management. The Department of Agriculture has found it necessary to issue a warning in regard to the misquotation of some of its publications dealing with eucalyptus. One of these publications, Circular 97, of the Forest Service, has been misrepresented as saying that California would in a few years be the only source of hardwood supply in the United States. Such a statement, the department says, "has never been made in any of its Forest Service publications, and is not considered a fact." The department statement further says that its "experts believe that there is promise of considerable success in the cultivation of eucalyptus trees in many parts of California.

but estimates of profits and of growth have been attributed to the department which are unauthorized. There are many uncertainties connected with eucalyptus culture which the investor should take into account." Naturally, the department objects to being misrepresented and to having its name used in advertising enterprises of which it has no knowledge and the managers of which are not conscientious in making statements that will promote their business.

This whole question of eucalyptus growing is one of great interest and importance, and experts are now at work upon it in the southwest and in Florida to ascertain under what conditions it can be successfully carried on. Owing to the rapid growth of the tree, its habit of growth, and the usefulness of its wood, it can be cultivated when the conditions and climate and soil are favorable so as to produce commercial crops in a much shorter time than other trees; but, like every other plant product, there are limitations which must be known and allowed for if any particular enterprise is to be commercially successful. Those who intend to enter the field, or to invest in any of the eucalyptus projects should, therefore, inform themselves as to the actual conditions and as to the management, and not absorb too readily the prospectuses of promoters. AMERICAN FORESTRY will take up this subject in forthcoming issues and will endeavor to give its readers adequate and reliable information in regard to it.



NATIONAL FOREST WORK

Working on Administrative Problems

Associate Forester A. F. Potter has returned recently from a trip of about a month to confer with national forest officers on the administrative methods of the Forest Service and to take up with them the questions of changes in procedure considered desirable by the Secretary of Agriculture and the Forester. He visited the offices of the district foresters at Missoula, Mont., Portland, Oreg., Ogden, Utah, and Denver, Colo. At Missoula and Portland he attended meetings of all the forest supervisors of Montana, northern Idaho, Oregon, and Washington. Mr. Potter attended the meeting at Missoula during the early part of the week of March 21 to 26, and the meeting at Portland during the latter part of the same week.

Secretary Wilson is anxious that in applying the national forest policy the fullest consideration compatible with the welfare of the forests be given to users and to persons entitled under the land laws to patents of national forest land. The listing of agricultural lands within the national forests, permitted by the law of June 11, 1906, when the land is found to be actually more valuable for agricultural purposes than for its timber, is an established part of the Forest Service work. Complaint has been made in some quarters that forest officers have shown an excess of zeal in opposing bona fide claims, and that the Forest Service has been too strict in applying the law permitting agricultural settlement. While the great majority of such complaints have been found, on investigation, to be without just cause, Secretary Wilson regards it as worth while to inquire whether any modifications of the present procedure are called for to insure that his wishes are actually carried out.

This does not mean that any departure from the policies which have governed the administration of the national forests is contemplated. It may be, however, that the details of the administrative work require looking after in some particulars to insure that the decisions of field officers actually apply the principles laid down for the Forest Service, and it is to inquire into this matter that the Secretary authorized Mr. Potter to make his trip.



Squatter Rights in National Forests

Secretary Wilson has just issued an order providing for a more liberal treatment of bona fide squatters upon unsurveyed land which has been included within national for-

ests since the time of actual occupancy of the land by the squatter.

Under the homestead law it is impossible for any one to secure legal title to unsurveyed public land, but occupancy pending survey is recognized as giving a prior claim to the land after survey, under what is known as "squatters' rights." A squatter who had, in good faith, taken possession of a piece of national forest land before the national forests were created is not dispossessed of his claim by the Forest Service, and if he lives upon it and cultivates it until the land has been surveyed, he is able to get his homestead just as though he had settled on any part of the unreserved public domain. But since the passage of the Act of June 11, 1906, which permits the Secretary of Agriculture to list for settlement land which he finds chiefly valuable for agriculture, it has been possible for squatters to apply for the listing of their lands under this Act, and thus to obtain title prior to the government survey. The object of the new order of the Secretary is to provide for the listing of the full amount of land which the occupant would receive if he exercised his option of awaiting the government survey, irrespective of whether or not the entire area is cultivable, provided the claim is bona fide and the land is not more valuable for its timber than for agriculture.

Secretary Wilson's order is as follows: "A person who has settled upon and continuously occupied unsurveyed lands within a national forest before its creation and is at the present time occupying such lands in good faith and is in all respects complying with the homestead law, has the right to include within the lines of his homestead 160 acres after the land is surveyed. Therefore, if the land is occupied for agricultural purposes and is not more valuable for its timber than for such purposes, and there are no circumstances which would in the opinion of the District Forester tend to discredit the bona fides of the claimant, he should be allowed to make application for the patenting of such lands under the Act of June 11, 1906, and the examination for listing should be made with a view of listing 160 acres of land where possible. The tracts as listed should conform so far as practicable to the form of the public land surveys. The listing of lands as above should not in any way govern the determination of the total area or amount of non-cultivable land listed for applicants under the Act of June 11, 1906, who were not residing upon the land before the creation of the forest. In cases where less than 160 acres of land has been listed to a person who settled upon the

land prior to the creation of the forest, an additional area sufficient to complete the homestead entry may be allowed upon proper application."

Grazing—Trespass on National Forests Still Criminally Actionable

The enforcement of the grazing regulations on the national forests is not affected by the recent decision of the Supreme Court of the United States, affirming the decision of District Judge Wellborn, of California. The position of the Secretary of Agriculture is set forth by Associate Forester Potter in the following letter to the District Forester at San Francisco:

"The decision of the United States District Court for the southern district of California in the case of the United States against Cazajous, Grimaud, and Inda has been affirmed by the Supreme Court of the United States by an even division of justices, there being four for affirmance and four against, the ninth member of the court not sitting. No written opinion was rendered, and could not be, in the nature of the case, because of the even division of the justices. Being evenly divided, the decision of the Supreme Court merely means an affirmance of the decision of the lower court in these particular cases, without any binding force in any subsequent cases that may arise for violation of the regulations of the Secretary of Agriculture governing grazing on the national forests. Therefore, you will continue the enforcement of the law and regulations and take the same action regarding any violations thereof as heretofore.

"In the event of a trespass case occurring in your district in which the circumstances are similar to those involved in these cases, you should proceed in accordance with the instructions relating to criminal trespass and if, upon presentation of the facts by the United States Attorney, the grand jury finds an indictment, and upon demurrer the decision of the court is in favor of the defendants, the United States Attorney will be instructed to remove the case to the Supreme Court of the United States for review. When the case reaches the Supreme Court, there will probably be a full bench and a final and authoritative decision of this court will be rendered."

In the decision rendered by Judge Wellborn sustaining the demurrer in the cases of Cazajous, Grimaud, and Inda, he did not question the right of the Secretary of Agriculture to control grazing upon the national forests, nor his right to prohibit any unpermitted grazing. That the Secretary has such authority had been expressly held by a higher court, the United States Circuit Court of Appeals of the Ninth Circuit, sitting at San Francisco, both in the case of Shannon *vs.* U. S. (120 Fed. Rep., 70), and in the earlier case of Dastervignes *vs.* U. S. (122 Fed. Rep., 30). Indeed, the authority of those decisions

was expressly recognized by Judge Wellborn. These cases were, however, civil cases in which the United States was granted injunctions restraining the defendants from grazing trespass upon forest reservations, while the cases of Cazajous, Grimaud, and Inda, decided by Judge Wellborn at Fresno, were criminal prosecutions.

Judge Wellborn held that while the Secretary of Agriculture has full authority under existing laws of Congress to promulgate regulations prohibiting grazing upon national forests except under permits, and while the forests can be protected against any violation of such regulations, by the bringing of civil actions and suits for injunction, still a violation of the regulations cannot be held to be a crime. In other words, the decision of Judge Wellborn did not question the right of the Secretary of Agriculture to enforce by civil process proper observance of the grazing regulations, but held merely that violations of the regulations could not be made the basis of criminal action.

Under the Criminal Appeals Act of March 2, 1907 (34 Stat., 1246), the Attorney General has instructed the United States Attorney at Los Angeles to sue out writs of error at once and have Judge Wellborn's decision reviewed by the Supreme Court of the United States. This is the first opportunity the government has had to obtain a ruling upon this question by the Supreme Court. The appeal will be prosecuted to as early a decision as possible.

Judge Wellborn's ruling is directly contrary to decisions by the following courts, which have held that violations of the Secretary's regulations are criminal and may be the subject of criminal prosecution:

U. S. District Court, District of Idaho, in the case of U. S. *vs.* Domingo (152 Fed. Rep., 566), decision by Judge Beatty, March 14, 1907;

U. S. District Court, Northern District of California, in the case of U. S. *vs.* Dequirro (152 Fed. Rep., 568), decision by Judge DeHaven, October 2, 1906;

U. S. District Court, South Dakota, in the case of U. S. *vs.* Bale (156 Fed. Rep., 687), decision by Judge Carland, September 3, 1907;

The Supreme Court of Arizona, in the case of Dent *vs.* U. S. (76 Pac. Rep., 455), opinion by Chief Justice Kent;

United States Attorney-General, John W. Griggs, also held (22 Opinions of Attorneys-General, 266) that any violation of the grazing regulations constitutes a crime and may be prosecuted and punished as such.

As heretofore, the grazing regulations will continue to be vigorously enforced upon every forest. Any willful violation will be at once reported by the forest officers and prompt action will be taken. Past experience has shown that only upon very rare occasions indeed is court action necessary. The acknowledged justice and propriety of the graz-

ing regulations have generally appealed to the sense of fairness of forests users, with the result that willing compliance with, and hearty cooperation in the enforcement of, the regulations have been the rule, and cases of willful violation have been of rare occurrence.



The Use of Hickory in the United States

In cooperation with the National Hickory Association, the U. S. Department of Agriculture has just completed a canvass of the principal hickory-using establishments to ascertain their annual requirements. In the last few years the users of hickory have become very much alarmed over the decreasing supply; so far, however, it has been impossible to get satisfactory statistics either of the total quantity of hickory yet standing in the forests or of the amount used each year. This is partly because a great deal of hickory is cut by small portable or stationary mills, which, after consuming all the timber within a radius of from two to eight miles, are either sold or moved to new points. Much hickory is also split into billets for spokes, handles, etc., instead of being sawed into lumber. Altogether, therefore, it is extremely difficult to make even a fair estimate of the total hickory consumption.

While the figures gathered by the association and the department are not as complete as were desired, they are at least significant. Hickory is especially sought for the manufacture of vehicle parts and of handles, in which great strength and toughness, together with moderate weight, are essential. It is estimated that, in the manufacture of their special products, the hickory-using establishments consume the equivalent of the following:

Product	Board feet
For spokes.....	45,000,000
For handles.....	29,000,000
For poles and shafts.....	18,000,000
For rims.....	16,000,000
For singletrees, doubletrees, neck-yokes, and bolsters.....	16,000,000
For axles.....	6,000,000
For sucker rods.....	1,000,000
For vehicle gear woods.....	600,000

Total..... 131,600,000

In addition to the hickory which is made directly into these special forms there is manufactured each year about 200,000,000 feet of hickory lumber, most of which is later remanufactured. The total quantity of hickory cut in the United States each year is therefore equivalent to not less than 330,000,000 board feet. According to the reports of the Bureau of the Census, the average value of hickory lumber at the mill is about \$30 per thousand, while the high-grade material which is necessary for the special uses listed above is worth at least \$50 per thousand. This makes the total value at the mill of the

annual hickory production not less than \$12,000,000.

Hickory is one of our most useful woods, but it constitutes only about two to five per cent of the total stand of timber in our hardwood forests. It is widely distributed throughout the eastern hardwood forests and was formerly most abundant and of unusually high quality in Indiana and Ohio. The supply in these states, however, has been greatly reduced by cutting, so that at present Arkansas is distinctly in the lead in hickory production, followed by Tennessee, and then by Indiana, Kentucky, and Ohio.



National Forest Work in Florida

Florida is about to get its first practical experience of the results of national forest administration. A reconnaissance survey of the Choctawhatchee Forest, which was put under control of the Department of Agriculture in November, 1908, by presidential proclamation, is now being made by a force of Forest Service experts. This survey will furnish information in the light of which use of the forests can be promoted through properly regulated timber cutting, through turpentine under the cup-and-gutter or the cup-and-apron method, and through grazing, without harm to the permanent value of the forests. Florida was the first state east of the Mississippi to have a national forest.

The Choctawhatchee Forest containing approximately 467,606 acres, is located in the western part of the state, along the Gulf, in Walton and Santa Rosa Counties. The Ocala Forest, embracing some 207,285 acres, lies in the central part, the greater portion of the forest being in Marion County, with a small fraction in Lake. The two forests were placed under administration November 1, 1909.

As long ago as 1825, Congress appropriated \$10,000 to buy live oak land on Santa Rosa Sound to make sure of a supply of ship timber for our war vessels. This reservation, together with other tracts subsequently set aside, made a total of 208,224 acres in Florida timber lands which the government proposed to hold as a source of supply for its ships. Large quantities of acorns were planted and many young oaks set out. But the plantation was not a great success, and the main effort was ultimately restricted to thinning out, pruning, and other silvicultural care of the trees of the natural forest. Today the new attempt at forestry in the Peninsular State promises much more encouraging results.

The party of eight Forest Service cruisers, headed by A. B. Recknagel, Assistant Chief of Silviculture at Albuquerque, New Mexico, have already commenced operations near the head of Little Alaquá. The crew will proceed westward to the western border of East Bay River. An accurate survey of all the

government land will be taken, the stumpage estimated, and a report made of the number of turpentine cups that, in accordance with the latest federal regulations, may properly be placed on the forest.

When the cruisers have completed their work on the Choctawhatchee, a similar inspection of the Ocala Forest will be made. It is thought the surveys will engage the force until the beginning of summer. Sites have been selected for the rangers' houses, to be built by contract.

A local estimator figures that the country-school and road funds will profit by the turpentine, grazing, timber cutting, and other receipts of the Choctawhatchee Forest to the extent of \$700 or \$800 this first year, since twenty-five per cent of all such revenues is to go into these two funds.

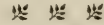


The New Pine Tree Nursery of Montana

The Forest Service is to have a new nursery in Montana. The Savenac nursery, the twenty-fifth of its kind maintained by the Department of Agriculture for its forest work, is situated in the Lolo National Forest on Savenac Creek, Montana, near De Borgia. The ground was plowed and harrowed last fall, the irrigation ditches run, and an ample water system installed. The tract will be laid out in 150 beds, each four feet by twelve. Over these will be broadcast the best of the seeds of native conifers gathered in the forest the past autumn. To prevent mice and birds from eating the seeds each bed will be protected by a lath and wire frame. This will also serve to shade the delicate plantlets during the tender period of their first year's life. A water system will supply the means of sprinkling the seeds and irrigating the young trees during the warmer, drier months. One man will be kept constantly at work watering the thirsty soil and otherwise caring for his interesting charge.

The Savenac nursery will have an annual productive capacity of 1,500,000 seedlings. When one year old—beginning probably in

the spring of 1911—these will be set out in transplant beds, where they will be expected to develop in two more years into respectable young trees. Thence they will be removed to their permanent home in the hills of the Lolo National Forest. Planting and direct seeding will be done on the great burned areas visible to passengers on the trains of the Coeur d'Alene branch, and also on extensive burns around the head waters of the Rattlesnake River in the Missoula Forest. The work is designed to add to the national timber supply in the coming years and to aid in the regulation of the flow of Montana mountain waters. The Savenac nursery will bring the aggregate annual plant-producing capacity of the twenty-five national forest nurseries up to 10,000,000 seedlings.

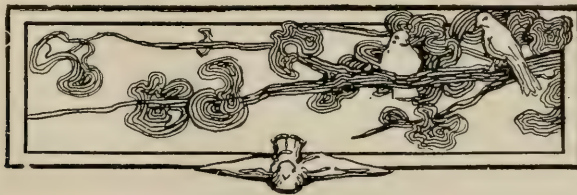


Government Improving Forests

It will be a source of surprise to many who do not understand the work of the Forest Service to learn of the permanent improvement work which has been carried on in the National Forests. On the forests of Arkansas, Arizona, and New Mexico the Service spent during the last fiscal year \$68,923.84 for permanent improvements. The primary object of expending money in this way is to make the forests more accessible to the public. Consequently a very large percentage of this money was spent in the construction and repair of roads and trails and many miles of telephone lines were also constructed. The report shows that a large percentage of the money was expended in the construction and repair of 253 miles of trails, thirty-two miles of wagon road, and 206 miles of telephone lines.

The stockmen residing within the boundaries of National Forests are receiving considerable help from the Service through the development of watering places.

The Service further helps stockmen by cooperating with them in the construction of drift fences, which aid stockmen in handling their stock.



STATE WORK

Colorado State Forestry Association

The following resolutions were adopted by the Colorado State Forestry Association, at its annual convention January 13th, held in the senate chamber of the capitol at Denver:

GIFFORD PINCHOT AND THE FOREST POLICY

"WHEREAS, Gifford Pinchot has accomplished a work of inestimable value in the conservation movement, and especially in forestry, therefore

"Resolved, That the Colorado State Forestry Association in convention assembled hereby expresses its appreciation and approval of the work accomplished by him in the past, and

"Resolved, That we express the hope that he may continue his valuable services in the cause of conservation, of which he is the recognized leader; and be it further

"Resolved, That we hope that his successor may carry out the forest policy, already inaugurated, and in this hope we extend to him our hearty welcome and earnest support."

WHITE MOUNTAIN AND APPALACHIAN FORESTS

"WHEREAS, the establishment of the proposed White Mountain and Appalachian National Forests would result in the protection of the sources of numerous rivers and streams, which are of priceless value for water power and navigation, and would result in the conservation of the forests thereon, and greatly increase the timber supply of a region which by nature is better adapted to the growing of valuable hardwoods than any other area in the United States, therefore

"Resolved, That this association urges the Congress of the United States to enact, at the earliest possible date, such laws as will result in the establishment of the aforesaid national forests."

The resolutions also approved the work of the Colorado Conservation Commission and asked that an appropriation be made by the state to render it more effective; urged the establishment of a national park and game preserve at Estes Park; commended the proposed forestry school at the State Agricultural College at Fort Collins and endorsed "the effort of Congressman Edward T. Taylor to secure the setting apart and granting to the said college by Congress of a suitable tract of timbered land from the public domain, conveniently located, for the permanent

and perpetual use of such school, for forestry study, experimentation and the practice of forestry, for the advancement of the science and knowledge of forestry within our state," and urged the employment by the state of a technical and practical forester who shall investigate and make public report on (1) the amount, species, value and condition of the timber on all state and private land in Colorado, and (2) on the advisability and nature of such legislation as shall ensure the most efficient protection from forest fires of the timber lands owned by the state and by private individuals, and of such other legislation as shall encourage the practice of forestry on such lands.



Forest Fire Protection in Idaho

Reports submitted at the annual meetings of four timber protection associations of northern Idaho in the offices of A. L. Flewelling in Spokane, March 15 and 16, show that in an area of 6,300 square miles 17,000,000 feet of green timber and 290,000 feet of logs were destroyed by fire in 1909. These figures are embodied in the report prepared by A. W. Laird of the Potlatch Lumber Company, head of the North Idaho Forestry Association, composed of organizations in the Potlatch, Coeur d'Alene, Pend Oreille and Clearwater districts. After showing the benefits of protection given by the owners of timber tracts in Idaho, Mr. Laird said that of the total number of feet of timber affected by fires there is a small percentage which may be utilized with but little depreciation in value, adding in part:

"The total expense of the four forest fire associations in the panhandle was \$51,251.94 last year, and of this amount \$14,936.52 represents the wages of fire wardens or patrolmen; \$5,472.73 was spent in clearing and building trails, \$4,171.87 in fighting fires, and the balance, \$26,670.82, was spent among our merchants and others for supplies, provisions, tools, camp equipment. A large sum found its way into the pockets of our homesteaders for board for patrolmen, horse feed, fresh vegetables, buttermilk and eggs.

"While the territory protected was more than 4,000,000 acres in extent, the entire expense was borne by the owners of 1,450,000 acres. The interests back of this great movement for the conservation of our timber protect two acres of timber from the devastation of forest fires for each acre which they themselves own.

"The experience we are gaining each year in the prevention and control of forest fires is greatly reducing the loss of timber from this cause. Our interest in the stumpage value of this timber is a mere bagatelle as compared with the interest of the community at large, for it is safe to say that in logging and manufacturing the timber now standing in the five northern counties of Idaho not less than \$200,000,000, and more likely \$300,000,000, will be paid out in the one item of wages to residents.

"Any one of the 322 forest fires which we successfully fought in 1909 with but small loss, or in fact any one of the thousands of small fires which were discovered by our patrolmen before any serious damage had been done, had it not been for the most excellent work of our men, might have developed into conflagrations which would have swept away hundreds of thousands of dollars of our investments, millions in the wages of our employes and caused untold loss in life and property of the residents of the locality.

"The moral as well as the financial support of the state board of land commissioners has been a potent factor in the success of the last year, as well as in previous years."

These trustees were elected for the North Idaho Forestry Association: President, A. W. Laird, Potlatch Lumber Company, re-elected; vice-president, J. P. McGoldrick, McGoldrick Lumber Company; secretary-treasurer, W. D. Humiston, Potlatch Lumber Company; T. J. Humbird, Humbird Lumber Company; C. P. Lindsley, Craig Mountain Lumber Company; E. N. Brown, Clearwater Lumber Company, and A. L. Flewelling, Monarch Lumber Company.

The Potlatch Association elected A. W. Laird, president; George A. Day, vice-president, and W. D. Humiston, secretary and treasurer. The directors are G. A. Day, C. H. Fancher, E. N. Brown, G. A. Rubedew and A. W. Laird. The president announced that the loss from fire in the Potlatch district last year was practically nothing, notwithstanding the danger caused by the clearing of a right of way for the Chicago, Milwaukee & Puget Sound Railway.

At the meeting of the Clearwater Fire Protective Association the following officers were elected: President, E. N. Brown; vice-president, G. A. Day; secretary and treasurer, B. E. Bush. The directors are E. N. Brown, G. A. Day, W. M. Deary and George R. Schofield.

The meetings were attended by James Turkish, Western Land Company; G. A. Rubedew, Rupp & Holland; E. M. Hoover, Payette Lumber and Manufacturing Company; F. A. Silcox, acting district forester, district No. 1, Forest Service; F. H. Fancher, Milwaukee Land Company; J. P. McGoldrick, McGoldrick Lumber Company; A. W. Laird, Potlatch Lumber Company; E. N. Brown, Clearwater Lumber Company; T. J. Humbird, Humbird Lumber Company; W. D. Humiston, Potlatch Lumber Company;

F. J. Davis, Edward Rutledge Timber Company; George A. Day, state land commissioner; B. E. Brush, state of Idaho, and W. G. Weigle, government supervisor of the Coeur d'Alene forest reserve.



Kansas

The Arbor Day proclamation of Governor Stubbs of Kansas, deserves perpetuation as an appreciative eulogy of the tree:

ARBOR DAY PROCLAMATION

"The genial days of spring call to our memory again the duty we owe to that ancient and useful friend of man the tree.

"In all ages of the world it has been true to our interest and loyal to our service. It has furnished the cradles and coffins of our ancestors; tables for the king and cottager alike. It has given comfort and shelter to the peasant and the prince—to the pauper and the potentate.

"Trees are the royal family of the vegetable kingdom. Neither the quarry nor the mine has done more for civilization than the forest. Neither stone nor steel can outlive or outrival the usefulness of the tree. It is more useful to civilization than silver—more valuable to civilization than gold. It gives us food and fire and shelter; it gives us books and newspapers and a greater variety of the necessities and luxuries of life than any other article of ancient or modern commerce.

"Trees have always figured in our divine and patriotic relations. Among them the religion of man was born. Groves were the first cathedrals of our race. Birds singing in their boughs and branches gave us the first idea of sacred music and the choir. God planted them in Eden for the sustenance of our first parents. From their leaves were fashioned the first garments that covered their nakedness. When God's displeasure threatened the extinction of our race Noah looked into the forest and found there the means of salvation. It was under the oak tree that Jehovah conversed with a great man in Israel. It was in the tree tops that David heard the voice of the Lord. It was among the palms of the Garden of Gethsemane that Jesus spent the last evening of his life. The battle for American freedom was consummated under the apple tree of Appomattox.

"For centuries, and until man came to profit by its use, nature denied the tree to the greater part of Kansas. We are now learning how it conserves the moisture in our soil, that it changes and modifies our climate, that it gives beauty and charm to our landscape, that it can solve the problem of slides and drifts and floods, that it influences our civilization and adds materially to the wealth and happiness of the people.

"Therefore, I, W. R. Stubbs, Governor of the State of Kansas, in accordance with the

custom of my immediate predecessors, and the delightful sentiment of a better generation, do hereby ordain and proclaim that Friday, April the eighth, will be set apart and dedicated to the planting of trees throughout the state, and I do especially urge the 500,000 school children of Kansas to participate in the enterprise.

"W. R. STUBBS,
"Governor."

❖ ❖ ❖

Ohio

The graduates of the Ohio State University forestry course will be qualified to perform valuable services to their own state if the proper encouragement is given. Ohio should secure and maintain forest reserves. There are large areas of cheap land on the watersheds of the state that should be perpetually forested. The service of these forested areas as natural reservoirs holding back flood waters and preventing drouth and the washing of the land would be very great. That the ripe timber taken off the land from time to time would pay an ample revenue has been demonstrated in the case of similar reserves. Doubtless Ohio has as great a need of the forestry service as any other state.—*The University News-Bulletin.*

Pennsylvania

Arbor Days have been named by the Governor of the Commonwealth, and on April 8 and 22, some attention will be given to tree planting by a very few devoted to the cause of forestation. The trees planted on these days are not sufficient in number to be considered in connection with forestation. If a state-wide boom for wayside trees could be inaugurated and Arbor Days converted into genuine working holidays for planting trees by the side of the roads of the state, a great change would soon be effected, and our shadeless, treeless country highways be converted into long avenues of shade and beauty.

Our laws provide for this wayside tree planting, but nothing is done about it. The shaded country roads seen elsewhere have inspired a desire to emulate them in this state. A sunburned, starving highway is easily made a shady lane, grateful to man and beast. If walnut, chestnut and hickory trees are planted there they will afford a beautiful setting for the street and their nuts will be appreciated and valued by boys and squirrels. Our native trees make good wayside trees in country districts and serve a double purpose.

Arbor Day is intended not so much to increase the number of trees as to increase the knowledge and love of trees and an understanding of their value among the people. The wider and more general is the observance of these special tree days the better it will be for the state and for the people who live in it.—*Philadelphia Press.*



NEWS AND NOTES

Foreign Planters Seek American Trees

The enterprise of German foresters and the importance of tree planting for forest purposes are strikingly shown by two items of news which come, the one from Montana, the other from Ontario. It is reported that a demand has developed for Montana larch seeds to be used by German nurserymen, while white pine seedlings are to be imported from Germany by the town of Guelph, Ont., for planting a 168-acre tract of land belonging to the municipality.

The Germans recognize that the introduction into their forests of valuable trees native to other countries may be decidedly to their advantage. Although as a rule the forest trees best adapted to each region are those which naturally grow in it, there are many exceptions. Norway spruce and Austrian and Scotch pine have been carried from their native home to other parts of Europe and to America and have been found well worth the attention of the grower of timber. Several of our own species have met with favor in Europe and flourished there, such as the Douglas fir, black walnut, and others. The Australian eucalyptus is proving a great find for America and South Africa.

Our own white pine long ago crossed the Atlantic in response to the needs of Europeans, whose forests are comparatively poor in tree species, and is now grown commercially on such a scale that when it is wanted for planting in its own native habitat the German nurserymen are often ready to deliver young plants here for a lower price than our own nurserymen will quote. Now the Germans are going to try the Western larch also. The request from the German nurseryman instructs the collectors to gather the choicest seeds when ripe this fall. One nurseryman on Flathead Lake has offered to exchange larch seeds for seeds of desirable German shrubs, which he intends to cultivate and sell in America. In the same region, four or five months ago, foresters of our own Department of Agriculture gathered seed for use in the neighboring Lolo Forest, where a new forest-planting nursery was begun last year.

The objects of the Guelph planting are, according to local accounts, to protect the town's water source by a forest cover over its springs in the hills, to make beautiful woods for a public park, and to provide for a future timber supply as a municipal asset. This follows the extensive work on the same broad grounds by the Metropolitan Water

Board of Massachusetts. In foreign countries, forest tracts are often owned and managed by towns and cities as a paying investment and to insure a permanent supply of wood for local consumption. The kinds of trees to be grown in the Guelph park have already been decided upon by the Ontario Agricultural College. The proposed reforestation promises to be of so great economic and sanitary value that the estimated cost of \$8 per acre for importing and planting the seedlings and caring for the growing trees is regarded as well worth while.



Trade in Pacific Coast Timber

San Pedro, a name almost unknown east of the Mississippi, is to-day one of the biggest lumber-receiving ports of the country, according to the figures of her collector of customs. The gazetteers of eight years ago assigned less than four lines of description to San Pedro. It was described as "a bay and inlet of the Pacific Ocean, in California, 105 miles southeast of Santa Barbara, thirty-three degrees, forty-eight minutes north." To-day it is known as the ocean port for the immense horticultural and commercial activity that centers about Los Angeles.

San Pedro's custom house figures show receipts last year of over 500 million board feet of lumber. This was largely redwood, Douglas fir, and yellow pine, brought in by coast vessels from the forests of the northwest. According to the Department of Commerce and Labor, New York's coastwise receipts of southern pine, for the year ended December 25, were a little under 490 million feet. Chicago received by water, for the full calendar year 1909, not quite 340 million feet of all kinds of lumber exclusive of logs; North Tonawanda, N. Y., received over 170 million; Ludington, Mich., nearly eighty million; Cleveland, about seventy-two million, and Detroit, a little over sixty-six million. The arrivals of redwood, pine, and fir, at all the ports of San Francisco Bay totaled 900 million feet.

The lumber arrivals at San Pedro are suggestive of the remarkably rapid development of southern California and also of the inland southwest. The fruit-growing section of southern California consumes much lumber, most of which is cut a full thousand miles to the north, but Washington, Idaho, and Oregon lumber is also distributed by rail from southern California to many inland points. Despite

the cost of the long ship transit added to the rail freight charges, the competition of lumber shippers who use the all-rail routes from the northwest coast states, or from the east, can be successfully met at several of these points by the ocean-and-rail route shippers.

The lumber business of the matchless forests of the northwest has been fighting against great odds in the Mississippi valley and eastern markets because of the cost of transportation. "In the Pacific Coast states, which contain so large a part of the total stand of national forest timber," says the Forester of the United States Department of Agriculture, in his Annual Report for 1909, "sales are made only when a fair price is offered and only under restrictions which safeguard the future welfare of the forest. Both these conditions tend to restrict sales in a region where timber is at present so abundant and so cheap. * * * The opening of the Panama Canal will of itself almost revolutionize the situation. Cuttings which cannot now be made in the best way for the welfare of the forest, because only the relatively high grades of timber can be sold, will then be practicable under much more favorable conditions."



The Pennsylvania Railroad Company's Forest Work

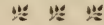
The Pennsylvania Railroad has planted 3,482,186 trees since it undertook forestry work on a comprehensive scale about eight years ago. In 1909 alone more than 1,000,000 trees were planted along the company's right of way.

Prior to last year, the forestry operations were confined to a limited area between Philadelphia and Altoona. In 1909, however, 7,800 trees were planted near Pomeroy, Pa., 188,200 in the vicinity of Vandyke, Pa., 35,000 near New Brunswick, N. J., 352,000 near Eyer, Pa., 30,000 near Metuchen, N. J., 161,825 at Denholm, Pa., 204,500 at Conewago, Pa., and 74,500 at Parkton, Md. The total number of plants shipped from the company's forest nursery at Morrisville, Pa., was 1,240,381.

A special effort was directed to growing ornamental shrubbery, and 6,000 plants, imported from France, were placed in beds at the nursery. There are 56,000 trees and shrubs which are now being held in nursery.

This work, so far as trees are concerned, has been forced upon the company by the increasing shortage of cross-tie timber. Other companies are forestalling future scarcity in the same way, but none, we believe, on so large a scale as the Pennsylvania. Nor does this company, like some of the others confine itself to the cultivation of the quick-growing catalpa, but gives preference to black locust

and red oak. And the effort is not confined to the cultivation of suitable timber, but involves the study and eradication of insect enemies of different trees and the perfection of wood preservative processes.



Forest Destruction

In his circular on the status of forestry in this country, Mr. Treadwell Cleveland, jr., of the Forest Service, assembles some notable facts. Speaking of the stocktaking of our forest resources, he says:

"It has shown that we are still destroying the forest as we used to; that we are taking from it every year three and a half times as much wood as is added by the new growth. It has shown that less than one-third of the growing tree felled by the lumberman is ever used at all, so that two-thirds of all the timber cut is simply destroyed.

"It has shown that one-eleventh of all the forests are swept by fires every year, and that on the average, since 1870, forest fires have yearly cost \$50,000,000 in timber and fifty lives.

"It has shown that over ninety-nine per cent of the forests in private hands—which comprise three-fourths of all the forest land and four-fifths of all the wood—is thus devastated by destructive use and the scourge of unchecked fires, while less than one per cent is properly handled for successive crops or effectively protected from fire. The forest as a resource is rapidly being obliterated."

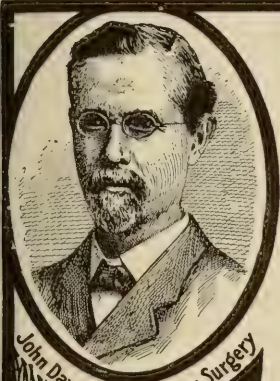


Bonds for Waterways

Speaking of the proposal to let Congress appropriate \$100,000,000 for the improvement of waterways, the *Houston (Tex.) Post* says:

"One thing is evident, however. No Congress is apt to appropriate \$100,000,000 for waterways out of current revenues. The revenue situation is entirely too precarious for that. Still, it would be entirely feasible to provide that sum, and even more, through the sale of low-interest-bearing bonds, such as are issued for the work on the Panama Canal.

"The sale of bonds for the purpose indicated would be good policy, certainly as justifiable as the sale of bonds for the work on the Isthmus. The importance of the isthmian canal to this country is going to be determined largely by the extent we improve our rivers and harbors. If it were a choice between the two, it would be more important to improve our own waterways than to dig the canal, but since both tasks are within our capacity, both ought to be completed as soon as possible."



John Davey Father of Tree Surgery

What Tree Surgery Is, and What It Is Not

Tree Surgery, as perfected by John Davey, is a scientific treatment of trees that have become diseased or decayed or injured in any way. It is the knowledge gained by him during years of patient study and experimentation. It does for the trees what dentistry does for the teeth, or what the physician does for ailing humanity. By the Davey methods of tree surgery any tree can be cured of its diseases, strengthened in its weak parts, its decay cut away and the cavity filled, and further harm to the tree stayed. Trees do not die if they receive attention in time from the Davey Tree Experts.

Tree Surgery is not the indiscriminate butchery of the trees. It does not employ the hacking and sawing methods of persons calling themselves tree doctors. It is not simply the filling of hollow trees with cement, regardless of conditions. It is not the scheme adopted by adventurers to extract money from persons who want their trees preserved and who know nothing about the nature or needs of the trees.

Who the Davey Tree Experts Are and Who They Are Not

The Davey Tree Experts are a company of practical men trained in tree surgery under the personal direction of John Davey, in a school established by him for the purpose of perpetuating his methods of saving the trees. They operate under his supervision, and employ his methods exclusively. They go to the trees and examine them and treat each tree according to its own needs. They are responsible in every way, and operate upon safe and sane principles.

They are NOT the irresponsible people who are seeking to make money by taking advantage of the fact that people want their trees preserved. They are NOT the people who attempt to imitate others; they have their original methods. They are NOT the fellows who go about the country professing to be tree experts, but who really know nothing about tree surgery.

"Our Wounded Friends, the Trees," an illustrated book showing the Davey methods, will be sent free to tree owners in the Mississippi Valley and Eastward.

THE DAVEY TREE EXPERT COMPANY, 214 Plane St., KENT, OHIO

(Operating the Davey School of Practical Forestry)
Representatives in all principal cities in the Mississippi Valley and Eastward. Send all inquiries to the main office

MR. MARTIN L. DAVEY, New York, July 3, 1908.
The Davey School of Practical Forestry,
Tarrytown, Westchester Co., New York.

Dear Sir: I am much pleased with the work on my trees at Scarsborough. It has been most intelligently and effectively done. I confess that before you undertook the work on my place I had no conception of the attention and care that trees require. I desire also to express to you my appreciation of the very efficient workmanship and the courtesy and excellent behavior of your representatives who carried out the work. I am, with kind regards, yours very truly,

EASTON H. SCHWAB.

JAMES D. LACEY

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Interested in Southern or Pacific Coast Timber?

We furnish detailed reports as to the QUALITY of the timber, giving average TOP and BUTT diameters, average lengths and number of trees on each 40-acre subdivision.

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We also furnish a TOPOGRAPHICAL map of all tracts located in mountainous districts, showing every elevation of 100 feet throughout the tract with OUR OWN engineer's report showing locations of most feasible routes and grades for logging roads.

We can furnish sufficient data regarding ANY tract of timber which we have examined to convince you whether the tract is just what you want or not. Personal inspection of any tract we may offer you will be found just as represented.

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We furnish detailed reports of amount of STUMPAGE on each 2 1-2- 5- or 10-acre subdivision of each forty.

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American Forestry

MAY

1910

THE HETCH-HETCHY VALLEY

By JOHN MUIR

MAJORITY REPORT ON THE WEEKS BILL HOW NEW JERSEY IS TRYING TO IMPROVE HER FORESTS

By ALFRED GASKILL

STATE REGULATION OF TIMBER CUTTING

An Abstract of the Maine Opinion and Papers by AUSTIN CARY and ALLEN HOLLIS

FOREST CONSERVATION AND TAXATION

By CHARLES LATHROP PACK

HISTORIC TREES OF WASHINGTON

By B. R. WINSLOW

EDITORIALS AND DEPARTMENTS



EVERGREENS BY THE MILLION

For Forestry Planting, we have for sale in Evergreen Seedlings, Austrian Pine, Norway Spruce, and Scotch Pine, 4/6, 6/10, 10/12, and 12/15 inches. Also Norway Spruce transplanted, 6/10, 10/12, 12/15, 18/24 inches and 2/3 feet. All of this stock offered is exceptionally well rooted and of very strong vitality. We meet all legitimate competition. Correspondence solicited.

THE SHERMAN NURSERY CO.

Charles City, Iowa



The Tools for Saving the Lives of Trees

Include specially trained heads and hands as well as instruments made of steel. Anybody can buy a tool-chest, but it requires patient study and actual experience under expert practitioners to fit a man for using the tools in a manner that will save tree life. Beautiful and healthy trees are a matter of not only a box of tools, but also of skillful treatment and careful attention upon the part of real experts.

The Davey Tree Experts Are Thoroughly Trained—

Trained in theory and practice, under the direction of John Davey, the "Father of Tree Surgery," in the Davey Institute of Tree Surgery. They have had wide actual experience in all parts of the country, and are now operating in the northern half of the United States, from the Missouri Valley eastward, and their services are available to tree owners in that portion of the country.

"New Life In Old Trees," by J. Horace McFarland, just out. Free to tree owners, on application. When you write, tell us how many trees you have, what kinds, where located, etc.

THE DAVEY TREE EXPERT COMPANY, Inc., 215 Plane St., KENT, OHIO

Representatives in Principal Cities from the Missouri Valley Eastward to the Atlantic
(Operating the Davey Institute of Tree Surgery; Formerly Called the Davey School of Practical Forestry)

American Forestry

The Magazine of the American Forestry Association

May

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Indexes for Vol. XV (1909) are ready and may be had on application

The American Forestry Association

is a national organization composed of public-spirited citizens who are interested in the prevention of the wholesale destruction of our forests, in forest extension and utilization, and in the fullest cooperation of national, state, municipal, and private agencies for these purposes. The Association has no business or governmental ties or alliances. Its work is to educate the people to know and understand the value and necessity of forests in the Nation's life and the way to maintain them to the best advantage through scientific forestry; and to bring about such wise legislation as will best secure the desired results. It is the people's forestry advocate and the representative of forestry before the people.

DEPARTMENTS OF WORK

MAGAZINE DEPARTMENT.—This department publishes **American Forestry**, the only popular monthly magazine of national circulation in its field. It has a strong force of editors and contributors and is well illustrated. The subscription price is *two dollars* a year.

EDUCATIONAL DEPARTMENT.—Series of educational and general bulletins and leaflets will be issued at intervals. These will be sent to all members and will be provided for distribution at a nominal cost. The first numbers of the general series are a brief summary of the history and need of the project for National Forests in the southern Appalachian and White mountains; the record of the vote on the Weeks bill, looking to that end, in the Sixtieth Congress; and a part of the argument for the Appalachian forests by the President of the Association, Hon. Curtis Guild, Jr., in his annual address for 1910.

LECTURE SERVICE.—It is proposed to establish a lecture service through which reliable lecturers upon forestry subjects may be obtained. This bureau will arrange with able lecturers at central points who will be available for lectures, with illustrations if desired, before clubs, associations, boards of trade, or general audiences.

CORRESPONDENCE BUREAU.—Through this bureau the Association will furnish information on forestry when possible and provide advocates of the cause with material.

LEGISLATION DEPARTMENT.—As it has always done, the Association will use the agencies at its command to secure the passage of wise legislation in furtherance of its great purpose. Its national character and the location of its main office in Washington enable it to keep in close touch with national legislation and it will cooperate, when practicable, with forestry workers in the several states to promote good state legislation. Its first and most important object in legislation is the passage of a measure for the creation of National Forests, with especial reference to the southern Appalachian and White mountains.

The development of these lines of work to their highest usefulness requires the maintenance of a considerable staff and an expensive plant. Contributions for the work, or for any particular phase of it, are always welcome. The income of the Association by which its general work is supported is derived from membership fees, which are as follows: **Annual members, one dollar yearly; contributing members, ten dollars yearly; sustaining members, twenty-five dollars yearly; life members, one hundred dollars, and patron members, one thousand dollars**, the two latter being exempt from further payments.

All members are entitled to all the rights and privileges of the Association. They receive all ordinary publications. Subscription to **AMERICAN FORESTRY** is extra. The price is **two dollars** a year.

The office is at 1410 H Street N. W., Washington, D. C.

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Dear Sir: I hereby signify my desire to become a member of the American Forestry Association. One dollar (\$1.00) for annual dues is enclosed herewith.

Very truly yours,

Name _____

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Photo by J. N. LeConte

"The upper forested part of Hetch-Hetchy Valley is charmingly diversified with groves of the large and picturesque California live oak, and the noble yellow pine, which here attains a height of more than two hundred feet, growing well apart in small groves or singly, allowing each tree to be seen in all its beauty and grandeur. Beneath them spreads a sumptuous fern carpet."—JOHN MUIR.

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No. 5

THE HETCH-HETCHY VALLEY

A National Question

By JOHN MUIR

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GARDEN.

THE better part of the world is beginning to know that beauty plays an important part in human progress, and that regarded even from the lowest financial standpoint it is one of the most precious and productive assets any country can possess.

Most of our forests have already vanished in lumber and smoke, mostly smoke. Fortunately, the federal government is now faithfully protecting and developing nearly all that is left of our forest and stream resources; nor even in these money-mad commercial days have our beauty resources been altogether forgotten. Witness the magnificent wild parks of the west, set apart and guarded for the highest good of all, and the thousands of city parks made to satisfy the natural taste and hunger for landscape beauty that God in some measure has put into every human being.

Timber and water are universal wants, and of course the government is aware that no scheme of management of the public domain failing to provide for them can possibly be maintained. But, however abundantly supplied from legitimate sources, every national park is besieged with all sorts of plans and pleas for possession of some coveted treasure of water, timber, past-

ure, rights of way, etc. Nothing dollarable is safe, however guarded. Thus the Yosemite Park, the beauty, glory of California and the nation, Nature's own mountain wonderland, has been attacked by spoilers ever since it was established, and this strife, I suppose, must go on as part of the eternal battle between right and wrong.

The Yosemite National Park is not only the greatest and most wonderful national playground in California, but in many of its features it is without rival in the whole world. It belongs to the American people and is among their most priceless possessions. In world-wide interest it ranks with the Yellowstone and the Grand Canyon of the Colorado.

The Yosemite National Park was created in 1890 by Congress in order that this great natural wonderland should be preserved in pure wildness for all time for the benefit of the entire nation. The Yosemite Valley was already preserved in a state park, and the national park was created primarily to protect the Hetch-Hetchy Valley and Tuolumne Meadows from invasion.

The Yosemite Park embraces the headwaters of two rivers—the Merced and the Tuolumne. The Yosemite Valley is in the Merced Basin and the



LOOKING UP HETCH-HETCHY VALLEY FROM SURPRISE POINT

Tueulala and Wapama Falls, with El Capitan between, Kolana Rock on right; lower meadow in foreground

Photo by Taber, San Francisco

Hetch-Hetchy Valley, the Grand Canyon of the Tuolumne, and the Tuolumne Meadows are in Tuolumne Basin. Excepting only the Yosemite Valley, the Tuolumne Basin is the finer and larger half of the park. Practically all of the Tuolumne Basin drains directly into Hetch-Hetchy Valley, which is a wonderfully exact counterpart of the great Yosemite, not only in its crystal river, sublime cliffs and waterfalls, but in the gardens, groves, and meadows of its flowery park-like floor. This park-like floor is especially adapted for pleasure camping, and is the focus of all the trails from both the north and the south which lead into and through this magnificent campground.

The floor of the Hetch-Hetchy Valley is about three and one-half miles long and from one-fourth to one-half mile wide. The lower portion is mostly a level meadow about a mile long, with the trees restricted to the sides and partially separated from the upper forested portion by a low bar of glacier-polished granite, across which the river breaks in rapids.

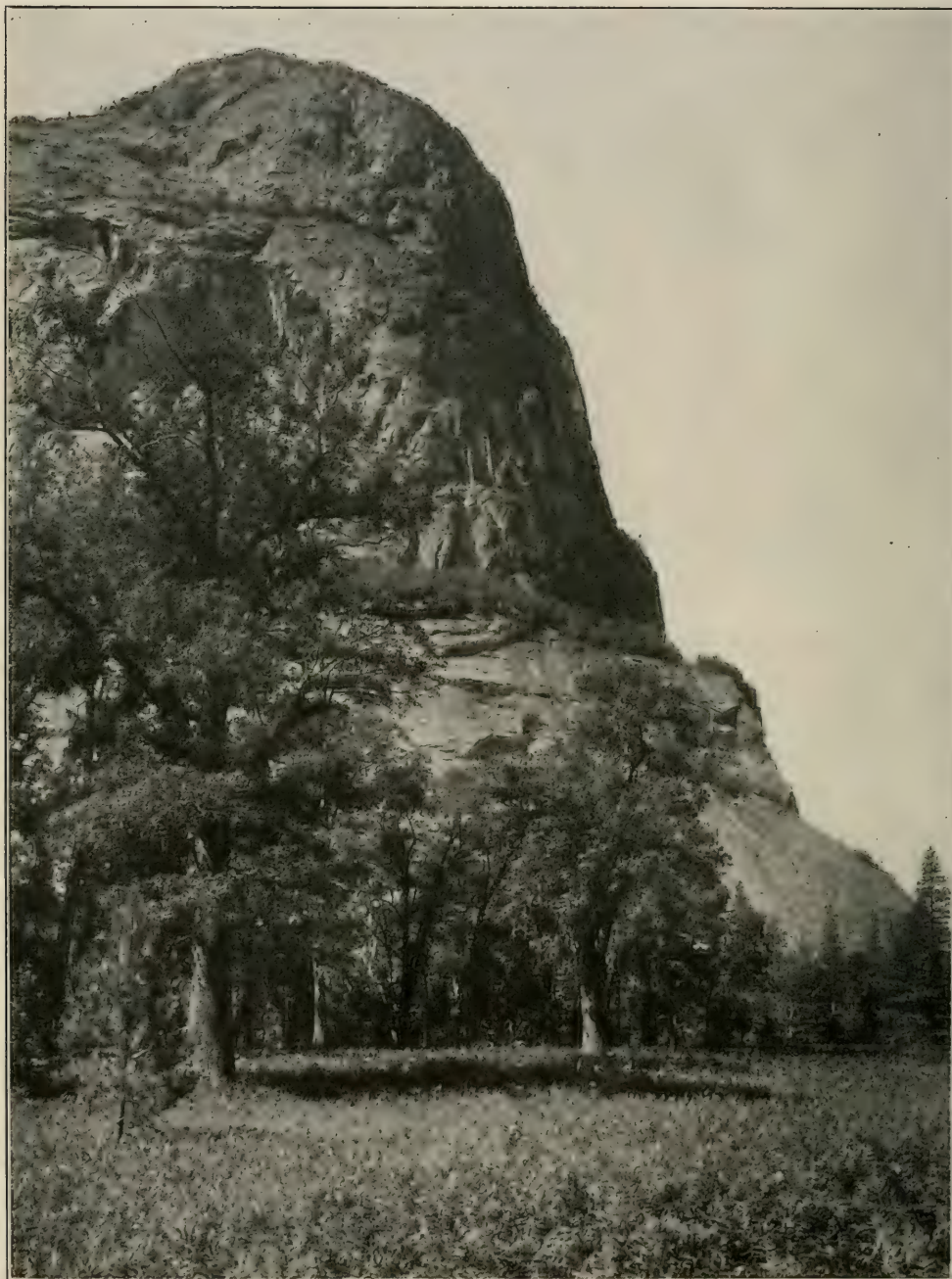
Standing boldly out from the south wall is a strikingly picturesque rock called "Kolana" by the Indians, the outermost of a group 2,300 feet high corresponding with the Cathedral Rocks of Yosemite, both in relative position and form. On the opposite side of the valley facing Kolana there is a counterpart of the El Capitan of Yosemite rising sheer and plain to a height of 1,800 feet, and over its massive brow flows a stream which makes the most graceful fall I have ever seen. From



Photo by Rodney L. Glisan

Rancheria Falls, Hetch-Hetchy Valley

the edge of the cliff it is perfectly free in the air for a thousand feet, then breaks up into a ragged sheet of cascades among the boulders of an earthquake talus. It is in all its glory in June, when the snow is melting fast, but fades and vanishes toward the end of summer. The only fall I know with which it may fairly be compared is the Yosemite Bridal Veil; but it excels even that favorite fall both in height and fineness of fairy, airy beauty and behavior.



KOLANA ROCK IN THE HETCH-HETCHY VALLEY
2,000 feet high

Photo by Herbert W. Gleason



General View of Hetch-Hetchy Valley

Photo by T. F. Kimman

So fine a fall might well seem sufficient to glorify any valley; but here, as in Yosemite, nature seems in no wise moderate, for a short distance to the eastward of Tueeulala booms and thunders the great Hetch-Hetchy fall, Wapama, so near that you have both of them in full view from the same standpoint. It is the counterpart of the Yosemite Fall, but has a much greater volume of water, is about 1,700 feet in height, and appears to be nearly vertical, though considerably inclined, and is dashed into huge outbounding bosses of foam on the projecting shelves and knobs of its jagged gorge. No two falls could be more unlike—Tueeulala out in the open sunshine descending like thistledown; Wapama in a jagged shadowy gorge roaring and thundering, pounding its way with the weight and energy of an avalanche. Besides this glorious pair, there is a broad, massive fall on the main river a short distance above the head of the valley. There is also a chain of magnificent cascades at the head of the valley on a stream that comes in from the northeast, mostly silvery plumes, like the one between the

Vernal and Nevada falls of Yosemite, half-sliding, half-leaping on bare glacier-polished granite, covered with crisp, clashing spray into which the sunbeams pour with glorious effect. And besides all these, a few small streams come over the walls here and there, leaping from ledge to ledge with birdlike song and watering many a hidden cliff-garden and fernery, but they are too unshowy to be noticed in so grand a place.

The principal trees are the yellow and sugar pines, Sabine pine, incense cedar, Douglas spruce, silver fir, the California and goldcup oaks, Balm of Gilead poplar, Nuttall's flowering dogwood, alder, maple, laurel, tumion, etc. The most abundant and influential are the great yellow pines, the tallest over 200 feet in height, and the oaks with massive, rugged trunks four to six or seven feet in diameter, and broad, arching heads, assembled in magnificent groves. The shrubs forming conspicuous flowery clumps and tangles are manzanita, azalea, spirea, brier rose, ceanothus, calycanthus, philadelphus, wild cherry, etc.; with abundance of



TUEULALA AND WAPAMA FALLS, HETCH-HETCHY VALLEY

Photo by Herbert W. Gleason

showy and fragrant herbaceous plants growing about them, or out in the open in beds by themselves—lilies, Mariposa tulips, brodiaeas, orchids—several species of each; iris, spraguea, draperia, collomia, collinsia, castilleia, nemophila, larkspur, columbine, goldenrods, sun-flowers, and mints of many species,

honeysuckle, etc., etc. Many fine ferns dwell here, also, especially the beautiful and interesting rock-ferns—pellaea, and cheilanthes of several species—fringing and rosetting dry rockpiles and ledges; woodwardia and asplenium on damp spots with fronds six or seven feet high; the delicate maiden-hair in mossy



Park-like Floor of Hetch-Hetchy Valley

Photo by F. F. Kinman

nooks by the falls, and the sturdy, broad-shouldered pteris beneath the oaks and pines.

In spite of the fact that this is a national property dedicated as a public park for all time in which every citizen of the United States has a direct interest, certain individuals in San Francisco conceived the idea that here would be an opportunity to acquire a water supply for the city at the expense of the nation.

But light has been brought to bear upon it, and everybody is beginning to see more and more clearly that the commercial invasion of the Yosemite Park means that sooner or later under va-

rious specious beguiling pleas, all the public parks and playgrounds throughout our country may be invaded and spoiled. The Hetch-Hetchy is a glaringly representative case, involving as it does the destruction of one of the grandest features of the Yosemite National Park, which, if allowed, would create a most dangerous precedent.

Judging from the way that the country has been awakened to the importance of park preservation, it is incredible that the people will tolerate the destruction of any part of the great Yosemite Park, full of God's noblest handiwork, forever dedicated to beneficent public use.



HISTORIC TREES OF WASHINGTON

By B. R. WINSLOW

THE cry of "Woodman, spare that tree," that has been sent ringing through the parks and gardens of the Nation's Capital by the champions of the trees who are fearful that a new order of architecture will destroy them, has brought to public attention some of the many historic trees of Washington.

Every country has its memorial trees which are highly venerated and around which cluster traditions and hallowed memories of antiquity dear to the hearts of the citizens. In the parks of European and Asiatic cities these trees are quite numerous, but in the cities of the United States they are comparatively few, not that we are lacking in veneration, but for the obvious reason that we are comparatively young.

Nevertheless, Washington's public parks and gardens contain many specimens of trees which are notable because of the historic interest attached to them. It is seldom, however, that the average sightseer runs across them for they are not tagged, at least not all of them. Memento hunters, who are always found among the large number of annual visitors to the Capital, make the labeling of these trees dangerous. The knives of souvenir hunters would soon ruin them. The superintendents in the various parks are acquainted with the location of the trees and the facts relating to their planting, and can point out the memorial trees to visitors.

In the Botanic Garden there are planted a large number of trees as memorials of men prominent in the Nation's history. One of the most interesting memorial trees in this garden is that planted in commemoration of President Garfield. It is growing on the border of the walk near the south entrance to the large conservatory.

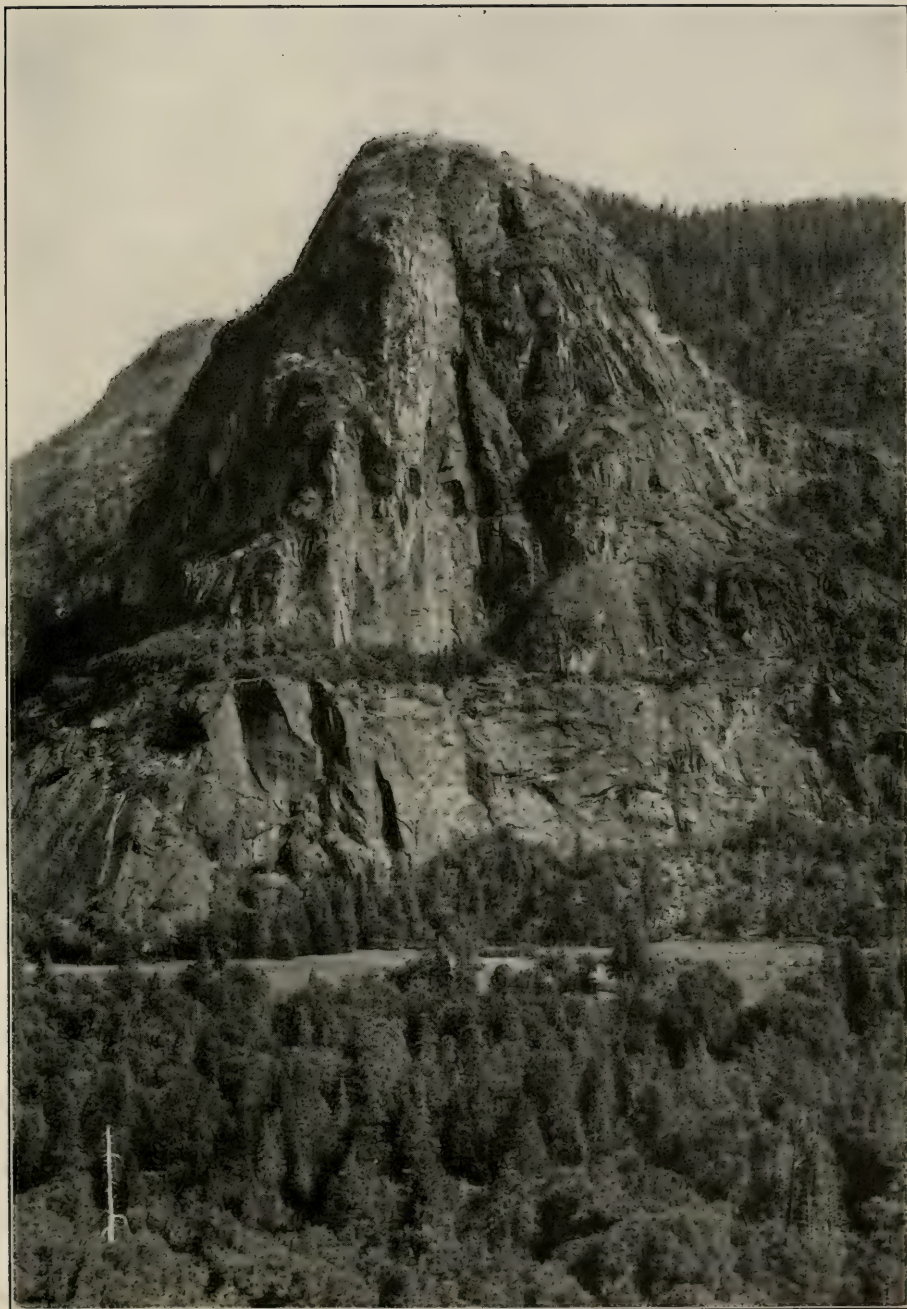
This tree has a novel history. At the funeral ceremonies of President Garfield a small seedling branch of acacia was placed on the coffin by a member of the Masonic order. After the burial this seedling plant was brought to Washington and was subsequently planted in its present location, where it has thrived from the first. Near this tree on the opposite side of the walk an acacia tree has been planted as a memorial to the late Gen. Albert Pike.

An Overcup oak tree was planted in 1863 by former Senator Crittenden of Kentucky, south of the eastern gate to the garden. The acorns from which this tree grew were brought from Kentucky by Robert Mallory, a warm personal friend of Senator Crittenden.

There is also in the garden a specimen of Chinese oak tree which has a novel history. Many years ago a friend of the late Charles A. Dana, while traveling in China, picked up a number of acorns under a tree shading the grave of Confucius and brought them to America, giving them to Mr. Dana, who planted several in his garden. One of the saplings grown from these acorns was sent to the Botanic Garden and was planted south of the greenhouse near Maryland Avenue and Second Street.

There are many other memorial trees in these gardens, among the most notable being the following:

The Beck memorial tree, an American elm, planted by the late Senator Beck of Kentucky south of the east gateway entrance. It was propagated from the roots of the Washington elm that was removed when the Capitol grounds improvements were in progress. The Alexander Shepherd memorial tree, another American elm, located near the Beck tree; the J. W. For-



KOLANA ROCK, HETCH-HETCHY VALLEY

From the foot of Wapama Falls

Photo by W. L. Huber

ney and Edwin Forrest trees, two cypress trees near the southern entrance to the gardens; the Conger tree, planted by the late Senator Conger of Michigan, south of the east entrance; the Hayes memorial tree, a rare native oak, planted near the western gate by Mr. Hayes when he was a member of Congress; the Palmer memorial tree, a Japanese walnut, planted by Mr. Palmer, the former public printer, near the western gate; the Bingham memorial tree, a European hornbeam bordering the south walk between First and Second Streets; the Hoar and Evarts memorial trees, two handsome specimens of the Cedar of Lebanon, planted by the late Senators Hoar and Evarts along the south walk between First and Second Streets; the Holman memorial tree, a superb Crimean fir, planted about forty years ago by the late Representative William S. Holman of Indiana in the lawn near the west door of the conservatory.

The most interesting of these nature monuments, however, grow in the White House grounds. One of the most notable of these is a stately American elm which was planted by John Quincy Adams, during his incumbency of that office. This tree is located on a mound southeast of the White House; and it stands a conspicuous object, towering above the surrounding plantings of a later date in the grounds.

Another American elm growing near the west entrance of the north roadway approach to the White House was planted by President Hayes in March, 1878, and a sweet gum tree in the lawn northeast of the Executive Mansion was planted by President Benjamin Harrison in April, 1892. President McKinley planted a scarlet oak in the lawn west of the White House, bordering the walk which now leads to the executive offices, and President Roosevelt and Mrs. Roosevelt each planted a fine specimen of fern-leaved beech in the White House lawns, as memorials to the "father of our country."

A Russo-American oak, planted April 6, 1904, in the lawn east of the west terrace of the White House, by President Roosevelt and Secretaries Hitchcock and Wilson, has an interesting history. The tree is a lineal descendant of a native American oak which formerly grew above and overshadowed the old tomb of Washington at Mt. Vernon. Acorns from this oak were sent by Charles Sumner, while he was a Senator of the United States, to the Czar of Russia.

Secretary Hitchcock, while Ambassador at the court of St. Petersburg, made inquiry with respect to the disposition of the acorns sent by Sumner to the czar and found that they had been planted on what is known as Czarina Island, which is included in the superb surroundings of the czar's palaces near Peterhof. There he found a beautiful oak with a tablet at its base bearing a Russian inscription, the translation of which is as follows:

"The acorn planted here was taken from an oak which shades the tomb of the celebrated and never-to-be-forgotten Washington; it is presented to his imperial majesty, the emperor of all the Russias, as a sign of the greatest respect, by an American."

Secretary Hitchcock gathered a handful of acorns from under this historic tree and sent them to Washington for planting, and thus secured a few oak saplings, one of which was set out in the White House lawn.

A beautiful specimen of the oriental plane tree, originally planted in the Botanic Garden by direction of the late Thaddeus Stevens, now forms one of the chief forestry attractions in Lincoln Park. The tree suffered in 1870 from an overflow of the Potomac River, which threatened its destruction, and it was removed from the Botanic Garden to the park, then an unimproved government reservation, and was planted in what is now the center of Lincoln Park.

In 1872, when this park was graded and improved with walks and ornamental plantings, a part of the plan

adopted for improvement was the construction of an oval mound in the center, intended to form the site of a colossal statue of the martyred President, Abraham Lincoln, which at that time it was proposed to place there. This oriental plane tree was then bare stemmed, with a few small branches near the top about eight feet from the original ground surface. The mound

was made around the tree, but from this bare stem roots were speedily sent out, and the tree commenced a vigorous growth of phenomenal rapidity and luxuriance, which has continued until the present time. It is now over seventy feet high with a nearly equal spread of branches, and is regarded by many as the most highly ornamental tree in the park.



The Capitol is but a fitting background for the display of its surrounding parking

HOW NEW JERSEY IS TRYING TO IMPROVE HER FORESTS

By ALFRED GASKILL, State Forester of New Jersey

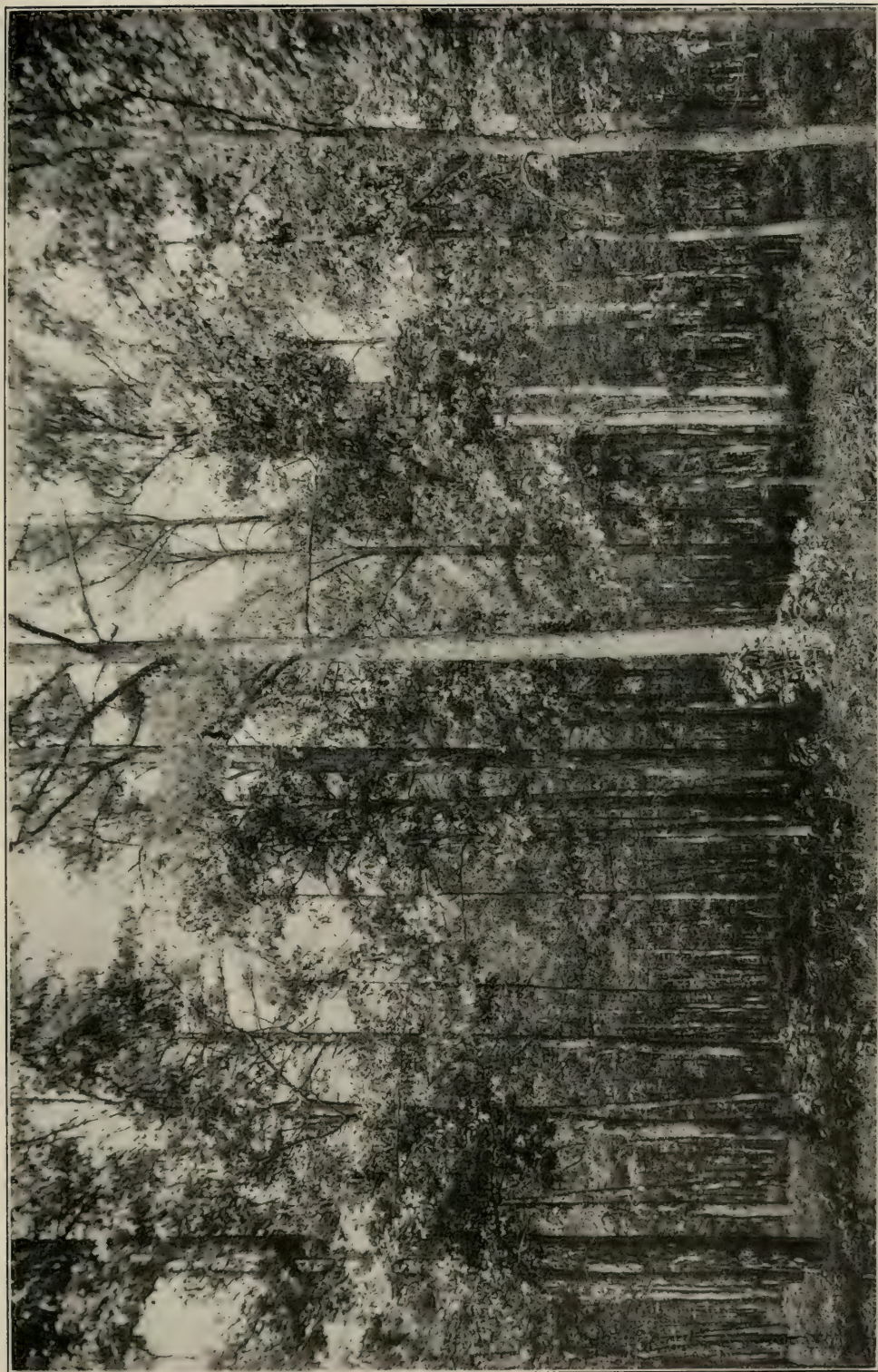
I N NEW JERSEY the campaign for forest conservation is taking a somewhat different line from that conducted in most states. With a population that in average density is exceeded only by that of Rhode Island and Massachusetts, the state has upward of 2,000,000 acres, or forty-six per cent, of its land area still in woodland. The opportunity for practical, profitable forestry of an intensive character is thus made evident. Probably nowhere in the United States do the forest areas and lumber markets lie so close together. In many ways the conditions are comparable with those of Württemberg, Saxony, and other German states where the forests often yield a higher net revenue than farm lands.

Like those of all other states which have little of the original forest left, the woodlands of New Jersey are little valued and their present product is almost insignificant. Yet this fact is another argument for forest management, since the necessary investment in land and immature trees is less than would be required were the property rated at a value based upon its producing power. This producing power is relatively high, for, even on the poor sands of the pine section, several commercially valuable trees will grow at a more rapid rate than is the rule on the average forest soil in the east. This, of course, is due to a favorable climate.

With the remnants of a once extensive and valuable forest that make planting unnecessary, with markets for forest products close at hand, with a soil better adapted for the growth of forest trees than is usual, the forest commission of New Jersey faces the

problem how to make the properties productive, how to turn the people from their old habit of neglect and abuse to a reasonable measure of care for their condition and earning power. The solution of the problem clearly lies in the control of forest fires, for it is a fact that since the state was settled these fires have been allowed to run almost unnoticed, and the harm done has been considered insignificant, or accepted as inevitable. Knowing that forest fires are controllable, the forest commission is giving most of its effort, and the greater part of the money appropriated, to the organization of a fire service covering the whole woodland and intended to protect the forests without regard to ownership. The state now owns about 14,000 acres of forest land which it is developing as examples of forest management, yet for the present this is only an incident in the larger task.

In most respects the New Jersey law is an unusually good one, and has three main features: First, the local firewardens, now numbering upward of 200, are all appointed, not *ex officio*, and are paid small annual salaries to compensate them for their clerical work and for the *prevention* of fire. In addition, each is allowed 30 cents an hour for time spent in fire fighting, with a minimum of \$2 for any call. Helpers are paid 20 cents an hour, with a minimum of \$1. The whole organization is under the control of a state firewarden, who is responsible to the forest commission, and is paid by the state. Second, every one who wants to burn brush or to make an outdoor fire for any purpose, must get a permit from a firewarden, except the fire be made in



FORESTS OF SOUTHERN NEW JERSEY

(1) The best type of hardwood forest



FORESTS OF SOUTHERN NEW JERSEY

(2) Pure pine forest of fair quality



FORESTS OF SOUTHERN NEW JERSEY

(3) A commoner type of pine forest, in bad condition through fire

an open place more than 200 feet away from the woodland, or in the more settled sections of the state where there are no wardens. This provision is steadily reducing the proportion of forest fires due to reckless burning. Third, as a means of controlling or preventing forest fires started from the railroads, each railroad in the state is required to construct and maintain fire lines not less than 110 feet wide, on each side of the track, wherever the road traverses a body of forest. The value of this last requirement is yet to be determined, for the first lines, about 180 miles in all, are only just made and five years are allowed for the construction of the total mileage. The belief is practically unanimous, however, that few fires will escape from them.

There is nothing new or novel in these protective lines; they have been employed in other countries for years, and even in this country some similar lines, though always much narrower,

have been made voluntarily by various railroad companies. A law making such fire lines a feature of the forest policy of an American state is, however, an innovation. These fire lines have two features: (a) At a distance of 100 feet from the nearest rail a strip ten feet wide is completely cleared of all inflammable matter and the bare earth exposed; (b) between that strip and the track is a zone from which only the undergrowth and the suppressed, or interfering, trees need be removed. All established trees as much as three inches in diameter at the base are allowed to stand, except where they are less than six feet apart, but each must be cleared of branches to a height of six feet. Where the line is made in unbroken forest this 100-foot zone is virtually given an improvement thinning. The better trees are freed from competition and allowed to grow so that their crowns will intercept and chill sparks thrown from the locomotive stack. In other situations, as where



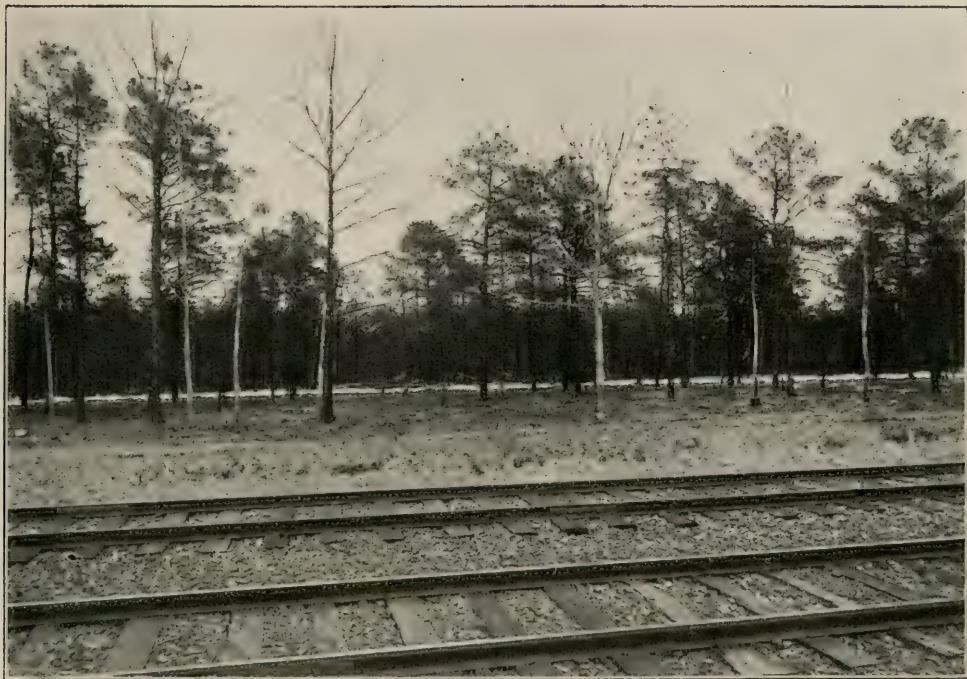
FORESTS OF SOUTHERN NEW JERSEY

(4) Volunteer pitch pine crowding out scrub oak; an early stage of a forest of vigorous growth and thousands of acres in extent, whose future is conditioned solely by fire

the right-of-way, or a wider zone, has been cleared, all forest growth must be sacrificed to the necessity of keeping the ground free from inflammable matter. The law provides that these fire lines must be worked over at least once a year and kept in a condition to prevent the escape of fire across the ten-foot strip. One point in connection with this law is to be noted; namely, that the railroad managers themselves are among those most hopeful of good results. The forest commission has had very little difficulty in carrying the law into effect.

New Jersey is thus definitely embarked upon a policy of fire control as the most hopeful means of preserving and developing her forests. Some attention is given to instructing the people in forest management, and some planting in an experimental way has been undertaken, yet in the firm belief

that forest management, forest planting, or even popular education in forestry will accomplish little that is practical so long as there is danger that everything will be lost through a forest fire. Therefore, the subjection of these fires will hold chief place in the program of the state forest commission. It is true that only a fraction of the woodland is burned over every year; it is true that fires are less frequent and less serious than they were a few years ago, yet it is likewise true that if the owner of a piece of woodland escapes for a few years he is sure to hasten the cutting of such a crop as he can get before the inevitable fire destroys it. This results in an overproduction of cordwood and an underproduction of everything else. Our forests must be so handled that every acre will *yield timber at a profit to the owner*. Firewood is rarely more than an incident.



RAILWAY FIRE LINES IN NEW JERSEY

(1) Looking from tracks across fire line



RAILWAY FIRE LINES IN NEW JERSEY

(2) Looking along fire line; the bare strip makes a sharp break between the danger zone and the forest

STATE REGULATION OF TIMBER CUTTING

ON THE 27th of March, 1907, the Maine senate asked the opinion of the Maine supreme court as to the power of the legislature in order "to promote the common welfare, etc.," to "regulate and restrict cutting or destruction of trees on wild and uncultivated land." March 10, 1908, the court rendered an opinion which has been widely commented on, especially since President Roosevelt's mention of it in his address to the Conservation congress. This opinion is frequently referred to as a "decision," which it was not, no case being before the court. It was a dictum in response to an inquiry by a branch of the legislature, and one of the justices declined to join in it, on the ground that no exigency existed sufficient to warrant the inquiry.

The opinion, an abstract of which is given herewith, was reported in the *Atlantic Reporter*, Vol. 69, No. 9, of date June 4, 1908.

The question of state regulation was made a subject of discussion at the annual meeting of the American Forestry Association in January, and two papers were presented, one from the standpoint of a forester, the other from that of a lawyer. These papers follow the abstract of the court's opinion below.

OPINION OF THE MAINE SUPREME COURT.

1. *Constitutional Law. — Police Power.* The legislature of Maine has, by the constitution of Maine "full power to make and establish all reasonable laws and regulations for the defense and benefit of the people of this state, not repugnant to this constitution nor that of the United States."

2. *Same.*—It is for the legislature to determine from time to time the occasions and what laws and regulations

are necessary or expedient for the defense and benefit of the people; and however inconvenienced, restricted or even damaged particular persons or corporations may be, such general laws and regulations are to be held valid unless there can be pointed out some provision in the State or United States Constitution which clearly prohibits them.

3. *Eminent Domain. Deprivation of property without compensation.* Legislation to restrict or regulate the cutting of trees on wild or uncultivated land by the owner thereof, etc., without compensation therefor to said owner in order to prevent or diminish injurious droughts and freshets, and to protect, preserve and maintain the natural water-supply of springs, streams, ponds and lakes, etc., and to prevent or diminish injurious erosion of the land and the filling up of the rivers, ponds and lakes, etc., would not operate to "take" private property within the inhibition of the constitution.

4. *Same.* While such legislation might restrict the owner of wild or uncultivated lands in his use of them, might delay his taking some of the product, might defer his anticipated profits and even thereby might cause him some loss of profit, it would nevertheless leave him his lands, their product and increase, untouched and without diminution of title, estate or quantity. He would still have large measure of control and large opportunity to realize values. He might suffer delay but not deprivation. While the use might be restricted it would not be appropriated or "taken." Such legislation would be within the legislative power and would not operate as taking of private property for which compensation must be made.

In discussing this opinion the Maine justices cited two Massachusetts cases:

Commonwealth vs. Tewksbury, 11 Metcalf 55 (a case decided in 1846), which prohibited the owners from removing any stones, gravel or sand from their beaches in Chelsea, as they were necessary to the protection of Boston Harbor.

The Massachusetts decision defined this as a "just and legitimate exercise of the power of the legislature to regulate and restrain such particular use of property as would be inconsistent with or injurious to the rights of the public."

Also, *Commonwealth vs. Alger*, 7 Cushing 53 (a case decided in 1851), in which the defendant was prohibited, by statute, from erecting a wharf on his own land, although it was admitted that his rights were complete, barring the statute, and that the wharf would not be an obstruction to navigation. Chief Justice Shaw in the most sweeping terms asserted the right of control of private property by the legislature in the public interest.

The following paragraph from the Maine opinion is of interest for its broad application to the present conservation movement.

"There are two reasons of great weight for applying this strict construction of the constitutional provision to property in land: such property is not the result of productive labor, but is derived solely from the state, itself the original owner; second, the amount of land being incapable of increase, if the owners of large tracts can waste them at will without state restriction, the state and its people may be helplessly impoverished and one great purpose of government defeated."

This opinion was signed by Justices Emery, Whitehouse, Strout, Peabody, Spear and Cornish. Justice Woodard had died while the matter was pending and Justice Savage declined to express any opinion on the ground that a sufficient exigency had not arisen to justify the senate in calling upon the supreme court.

It was, therefore, practically a unanimous opinion of the court.

DISCUSSION BY A FORESTER

By AUSTIN CARY

Superintendent of State Forests of New York

THE ideas which I have to contribute on the subject under discussion arise mainly from experience, first in the employ of operating lumbermen, and second as a state official. I believe they are all on the conservative, go-slow side.

In the first place, the opinion of the Maine supreme court (and as a resident of Maine up to seven months ago, I have taken great interest in that), while it may be thoroughly good law, does not seem to me from the lumberman's or forester's point of view to cover all the ground. The court says that preventing a man from cutting his smaller, growing trees is not taking his property but postponing its use—that he has it just the same and may use it at a later time. That is true in the literal sense, but does not cover the whole problem. Not, I think, for the owner of the timber. He has in the first place to bear interest charges on his investment from one period to the other and the relation is questionable between interest and the income from growth that might offset it. Second, he has to pay taxes on the property, and to my mind no greater hardship or injustice could be worked on a forest owner than to compel him to hold his property subject to the sort of taxation which he is liable to in some of our states. Third, the safety of the property from one period to another is by no means assured. The owner prevented from realizing on his timber at the present time may before he can get at it again find it burned, killed by insects or blown down. Lastly this principle as far as enunciated leaves out of sight entirely the desires, necessities and financial relations of the owner of the property. Such property may be held with reference to a particular manufacturing enterprise or for income derived at a particular time. The interest of the community perhaps should override these considerations, but at

least in our enthusiasm to promote that interest they should not be left out of sight.

It is public sentiment apprehending the necessity for it that will bring about regulation of cutting whenever it does come, and I feel that it is very important that public sentiment should be sound and sane, based on just views and correct information. In this connection let me call attention to one thing that illustrates the principle.

From time out of mind we have had periodical agitations on the subject of timber supply, calling attention to the decrease of supplies, predicting timber famine and calling for radical measures of one sort or another to forestall it. In recent years this agitation has been renewed, with much better spirit than formerly and on a much stronger basis, but still, as some are convinced, in a form that goes beyond the exact facts. There are many who, seeing that timber supplies in large sections are reproducing, believe that lumber for common purposes will be abundant for a very long time; who reflect that the finest sizes and grades of timber are in the main luxuries, not necessities, and that, too, their enjoyment may be greatly extended by the use of veneers; and who, in regard to the whole problem feel a confidence that the invention and resource of their countrymen, manifested already in this very field, will very largely stand in the gap to prevent the sustaining of heavy shocks and great loss. If this view is correct, then some recent agitation has been exaggerated; and while striking pictures are often indispensable to give birth to a public sentiment that will call for and sustain action, when the time comes for legal regulation an over-strained sentiment, based on exaggeration, may be a very dangerous thing. I feel that it may not be too early, even in our present deliberations, to reflect on that.

Let us clearly understand, for another thing, that the enforcement of regulations by the state means in and of itself higher prices for forest products.

Coupled with this thought is the further one that regulation of forest cutting should not be an outside or an ex parte matter, but that all interested and informed parties should contribute to it with their special information and with their assent. I do not mean by this that the consent of all forest owners is essential, or that they should be the formulators of the plan. But I do think they should be consulted in regard to the operation and effect of such measures, and it does seem to me that one true test as to whether any regulating law is desirable and workable is that it is assented to by some at least of the liberal and progressive lumbermen. This touches not merely the soundness and fairness of the method of regulation, but the possibility of the law's enforcement; for laws that run counter to the interests, the judgment and the sense of fairness of those who are touched by them cannot be enforced and had better not be passed.

It seems to me that New York state during the past year in the history of the law requiring tops to be lopped from soft wood trees cut in the forest preserve counties, furnishes an illustration of how these things should be done. The law itself, passed by the legislature of 1909, was framed with the cooperation of lumbermen. In its administration the state authorities, realizing that it was a new thing, were reasonable and patient, though firm. Some men on whom the expense came and who from the operation of the law could not possibly derive benefit themselves naturally objected to it, and based on one ground and another a considerable body of opposition during the course of the season grew up. This came out at the recent meeting of the Adirondack Lumbermen's Association, where also the state was represented, and after full and fair discussion the opposition was outvoted and the law will continue in force. Whatever it may be worth, here is an example of successful regulation by the state, yet it might have been turned into failure by mistakes at several points.

Then we want to understand that legal regulation, in order to accomplish its own ends, is not altogether a simple matter. Men have talked many times as if all that is necessary to carry out the principles of forestry is to leave standing the timber under a certain size. Working foresters have long ago gotten beyond that point. They know that the cleanest kind of cutting is often the best forestry, and that a hard and fast rule shuts out the possibility of some highly desirable operations such as thinning. Further, they understand perfectly that regulation of any kind that is to result in the best way must take into account many important considerations—the silvicultural facts, operating methods, the owner's desires and necessities. Only such regulation as this is entitled to be called forestry, and only such will fully meet the necessities of the case. It may not indeed be practical in our early attempts at regulation to aim for or expect the best results, but only to set broad limits beyond which men shall not go; but the real complexity of the matter must be held in mind, administering officers must be men who thoroughly understand the ideals to be gained, and it must be recognized that regulative laws might easily be framed that would do less good than harm.

As illustrating this matter, let me remind my hearers of the problem put before the forestry profession of the country by Mr. E. A. Beamiff, formerly in charge of lumbering on Indian reservations in Wisconsin. With ten years to operate a country by railroad and limits of expense naturally in force, he asked the help of the profession in formulating plans by which the operation could be carried on at a profit and a reproduction at the same time secured. This showed a real grip on the actual points of the problem on the part of this forester. I do not know that Mr. Beamiff received any satisfactory replies. A problem somewhat similar the authorities and lumbermen are trying to work out in New York state.

Legal regulation at its best is not a simple or inflexible matter. A variety of facts must be taken into account, a

policy made up which recognizes the silvicultural necessities, the methods of operation and the wishes and necessities of owners, and freedom must be allowed for variations according to the judgment of the officers whose duty it is to see the law carried into effect.

As to the objects to be gained by regulation, it seems to me that President Taft in his recent conservation message stated a principle that is needed when he stated that the interests of the present ought to be considered as well as those of the future. That would be a strange suggestion to make in some assemblies, but it strikes me it may be needed here. To apply it to the matter in hand we may note that needless waste of available material is quite as well worthy of consideration as the interests of a future crop. More so, it would seem to many, for this bird is in the hand.

Thus, when yellow pine ties are hewn in the South, sacrificing one third of the lumber available in order to get down to the heart, and sent into the northern country where vast quantities of cheap material suited to the purpose still stand, a vast waste and loss occurs which perhaps should be taken into cognizance by the law. It will, however, be far better if such wastes are rectified by the development of actual business, and in this particular case it is likely that this will soon be done. Economy in the use of present stocks of timber is, however, of importance, as well as a provision for a future crop, and laws designed to secure close utilization and to make sure that high-class timber does not go to inferior uses would be fully as easy to formulate and to operate as those aimed at the other end. Fundamental to the whole business, however, to economy in the use of timber and to maintenance of the growing power of the land, is efficient fire protection. In some circumstances this once secured seems to answer every reasonable end.

Thus far, only the interests of timber production have been considered, the questions relating to the utilization, reproduction and perpetuation of timber crops. It is realized fully, however,

that other interests are involved in some regions, preservation of soil, regularity of water flow and attractive scenery being chief among the number. On this subject I desire to say that what we shall need most is clear knowledge of the facts, and then the demarcation of such areas under the head of protection of forests or some similar term. Second, third, and fourth head, repetition of the ideas in Marsh's great work, "The Earth as Modified by Human Action," is not sufficient basis upon which to base positive legislation strongly affecting private interests. Accurate, trustworthy information is a requisite here, and that we are only just beginning to get,

When this information is in hand and areas of protective forest are proclaimed, the question will arise if public ownership is not altogether the best solution of the problem, rather than the regulation of the private holder. It certainly is simplest and surest, and unless types of forest are such that they will produce an income at the same time that the protective offices of the forest are maintained, it is the only real solution.

I feel that New York state in acquiring its forest preserve in the Adirondack and Catskill Mountains is pursuing the most just and satisfactory course, a course which it will pay all our states to follow in the care of truly protective forest areas, at whatever cost of money and sacrifice.

In conclusion, some of the salient points may be briefly summarized:

1. Adequate fire protection often secures in reasonably good fashion all the objects necessary to secure reproduction and growth of the forest and maintenance of its protective office. In my opinion the state of Maine, in which this judicial opinion originated, will be among the last of the states to act upon it, except with the purpose of promoting this particular end, because of the abundant reproduction and rapid growth of the region, its freedom from soil erosion and the regular flow of its rivers due to topography and the existence of lakes. Regulation or state

ownership will be needed more the farther these ideal conditions are departed from.

2. To compel men to hold standing timber while it is subject to such taxation as it is exposed to in some of our states is an injustice not to be borne. The tax law must be revised first.

3. Legal regulation of cutting is a different matter, so difficult that when education will accomplish the same end, as it will in many cases, it should be employed to the full before resorting to the other measure.

4. Public ownership of those tracts on which the maintenance of forest cover is indispensable, is the simplest and most satisfactory means of attaining that end. In some types of forest regulation to secure its protective agency will really amount to confiscation of its money value.

5. Hard and fast rules like a diameter limit are very imperfect means of regulation, entirely inapplicable to some types of forest. If complete plans cannot be made, then some limit should be defined, like devastation or destruction of the growing power of wood land, terms to be interpreted by state officers under supervision of the courts, beyond which the owner will not be permitted to go.



DISCUSSION BY A LAWYER

By ALLEN HOLLIS, of New Hampshire

ONE of the memorable dates in our history is May 13, 1908. It marks no great victory at arms, nor hero's birth; but on that day President Roosevelt gave to the world the doctrine of conservation as a living force, since grown into the issue of our times.

The President's opening address to the Congress of Governors, with characteristic vigor, emphasizes the immediate danger of exhausting our national resources, including our forests. It suggests a remedy—state regulation; and as authority quotes a recent opinion

of the supreme court of the state of Maine and a decision of the United States Supreme Court.

The recommendation of this policy by such eminent authority arrested the Nation's attention. Lovers of the woods rejoiced. Those who fought federal ownership of timber lands grasped this new weapon with zeal. Preservation of forests by statute, without cost to the state, appealed to all—except those who owned the lands and hitherto had ruthlessly devastated them in their selfish pursuit of wealth.

To many lawyers who believed they knew something of constitutional limitations, this announcement came as a surprise—possibly as a shock. Probably, as stated by Mr. Justice Holmes and quoted by the President, "there are benefits from a great river that might escape a lawyer's view;" but benefit alone has not been understood to justify depriving a citizen of his property or the useful disposal of it, without just compensation.

If any justification is needed for examining into the basis and scope of this theory of state regulation, it may be found in the thought that too much reliance upon any policy may tend to hinder progress on more effectual lines.

Portions of the language used in the cases referred to reach the limits which have been set by courts of authority in applying the doctrine of police power. Precisely what the cases decide, and even more, what they signify, are important questions.

First, let us consider *Hudson County Water Company vs. McCarter*, decided in the Supreme Court April 6, 1908, and reported in 209 U. S., 349. The point actually decided was merely that a statute of New Jersey which prohibits carrying out of the state the waters of any fresh-water lake or water-course is a valid exercise of the state's authority. An injunction against the violation of the provisions of this statute was granted in the state court on the familiar ground that the defendant had no right, as riparian proprietor, to divert water to a distance. This view was up-

held in the Supreme Court; but a broader ground was there applied—the inherent right of the state to protect its natural "advantages." Referring to the public interest of the state to maintain its rivers substantially undiminished, the court, through Mr. Justice Holmes, says:

"This public interest is omnipresent wherever there is a state, and grows more pressing as population grows. The private right to appropriate is subject * * * to the initial limitation that it may not substantially diminish one of the great foundations of public welfare and health." * * *

"It," referring to the state, "finds itself in possession of what all admit to be a great public good, and what it has it may keep and give no one a reason for its will."

The portions of the opinion which appear particularly to apply to our subject are as follows:

"But it is recognized that the state, as quasi-sovereign and representative of the interests of the public has a standing in court to protect the atmosphere and the water and the forests within its territory, irrespective of the assent or dissent of the private owners of the land most immediately concerned." Citing *Georgia vs. Tennessee Copper Company*, 206 U. S., 230, 238, and *Kansas vs. Colorado*, 185 U. S., 125, 141; 206 U. S., 46, 99.

"All rights tend to declare themselves absolute to their logical extreme. Yet all, in fact, are limited by the neighborhood of principles of policy. * * * The limits set to property by other public interests present themselves as a branch of what is called the police power of the state. * * *

"The public interest is omnipresent wherever there is a state, and grows more pressing as population grows. It is fundamental, and we are of opinion that the private or riparian proprietors cannot be supposed to have deeper rights.

"We are of opinion, further, that the constitutional power of the state to insist that its natural advantages shall

remain unimpaired by its citizens, is not dependent upon any nice estimate of the extent of present use or speculation as to future needs."

Those who would support this idea that the state may regulate timber cutting find in these words authority for their position. "Protect the forests" * * * "irrespective of the assent or dissent of the private owners." "The public interest is omnipresent." "The constitutional power of a state to insist that its natural advantages shall remain unimpaired"—these expressions are striking. They are fundamental, and seem a ready answer to ancient notions concerning the rights of private property.

No one would undertake to question the importance of these utterances by our highest court. They demonstrate the patriotic and progressive spirit of that great tribunal, and bear splendid testimony of the protection which it affords to public rights against private and corporate aggression. Beyond that, they give promise of future safeguards to the paramount interests of society in matters affecting the public welfare.

Granting all this, it is the lawyer's duty to inquire soberly into the true effect of a decision, and to interpret its language in the light of earlier cases.

The true effect of this decision, which has been so widely quoted, is merely to recognize the state's right to limit the use of public waters, which it holds in trust for its people. "What it has it may keep and give no one a reason for its will." The rights which are limited are the relative rights to devote the waters to private uses. Such rights, though ordinarily appurtenant to the adjacent soil, must yield to the needs of that public for which the waters are primarily held in trust. The question of state interference with property actually owned by the individual is not raised or considered.

It is declared that the state "has a *standing in court* to protect * * * the forests, irrespective of the * * * dissent of private owners." This might be taken to mean that a state may in-

terfere to prevent the destruction of forests by the owner; but a reference to the cases shows that it actually means nothing of the sort. The two well-known cases that are cited make it clear that the court used these words in their exact sense.

The case of *Georgia vs. Tennessee Copper Company*, 206 U. S., 230, one of the cases cited by Mr. Justice Holmes, arose in this way: The attorney general of the state of Georgia brought proceedings in the United States court in the state of Tennessee to secure injunction against the Tennessee Copper Company, which was so operating its works as to cause noxious gases to flow from its stacks into the state of Georgia and there injure the timber and other crops on the ground. The question decided in the United States Supreme Court was that the state of Georgia, as quoted by Justice Holmes, had a standing in court to have an injunction issued against the corporation in the other state that was so conducting its works as to cause an unjustifiable and unreasonable destruction in the state of Georgia. I want to quote a word from that decision to show the origin of this suggestion, "irrespective of the assent or dissent of the owners of the property most immediately concerned." The court says, again by Justice Holmes:

"It is a fair and reasonable demand on the part of a sovereign that the air over its territory should not be polluted on a great scale by sulphurous-acid gas; that the forests on its mountains, be they better or worse and whatever domestic destruction they have suffered, should not be destroyed or threatened by the act of persons beyond its control; that the crops and orchards on its hills should not be endangered from the same source. * * *

"We are satisfied, by a preponderance of evidence, that the sulphurous fumes cause and threaten damage on so considerable a scale to the forests and vegetable life, if not to the health, within the plaintiff state as to make out a case within the requirements of Mis-

souri *vs.* Illinois, 200 U. S., 496. Whether Georgia, by insisting upon this claim, is doing more harm than good to her own citizens is for her to determine."

That in answer to a position taken in the brief on the part of the company that many of the citizens of the state of Georgia were entirely satisfied to have this thing go on because of the business they were getting in connection with the manufacture.

The other case decided by Mr. Justice Holmes was the case of Kansas *vs.* Colorado, 185 U. S., 139, and 206 U. S., 46, which merely covers the point that one state may obtain relief against another to prevent the diversion of the waters of a river unreasonably so as to prevent its flow from the upper state to the lower one. To the same effect is Missouri *vs.* Illinois, 180 U. S., 208, involving the pollution of an interstate stream.

These cases abundantly sustain the decision of Mr. Justice Holmes that a state has a *standing in court* to *protect* the atmosphere, the water, and the forests, and as abundantly sustain the position here taken that his decision does not extend to the preservation of forests from destruction by the actual owner.

In dealing with the Supreme Court decisions, it has seemed sufficient to confine the discussion to the cases cited by President Roosevelt and by other less eminent exponents of the policy of state regulation. In actual decision, these seem inconclusive. The only language bearing directly upon the point, appears in Judge Holmes' opinion in Georgia *vs.* Tennessee Copper Company, and is clearly negative.

"It [the state] has the last word as to whether its mountains shall be stripped of their forests and its inhabitants shall breathe pure air. It might have to pay individuals before it could utter that word, but with it remains the final power. * * *"

It would be rash to assert that the Supreme Court would not uphold reasonable state regulation of timber cut-

ting; but that it has not yet gone to such lengths is a conservative statement.

The supreme court of Maine certainly has rendered an opinion that some measure of state regulation is permitted by the constitution in that state. Advisory opinions lack somewhat of the authority of decisions in litigated cases; but this opinion is as definite as words permit. Its effect may be thus stated in language selected from the questions submitted and the opinion itself.

The state has legislative power to promote the general welfare, as an efficient means to this end, by laws to regulate or restrict, without compensation, the cutting or destruction of trees growing on wild lands.

It is evident from the opinion that the court had in mind a situation where the regulations might defer or somewhat diminish the profit, but would not deprive the owner of his property or even the ultimate profitable use of it. For the general good, the owner is to be compelled to yield something of his hitherto unhampered right to destroy his own.

Whether such a doctrine is good morals depends largely upon the point of view. That it is the law in Maine at present is settled; that it is sound law as a general proposition is yet to be determined.

The lengths to which a state may go under the police power is a question upon which the decisions in different states are hopelessly at variance. In some, the rights of property are considered to be well-nigh sacred; in others they seem to be less regarded. While Maine, in the case just considered, shows a tendency towards the extreme on one side, the sister state of New Hampshire holds the balance on the other side.

In a recent case (State *vs.* Jackman, 68 N. H., 318), the supreme court, by unanimous decision, held that a law requiring abutting owners to clear sidewalks of snow was unconstitutional and could not be supported under the doctrine of police power, saying that such

power "properly extends to the protection of public morals, public health, and public safety." Instead of recognizing the doctrine that private property must yield to "general regulations which are necessary for the common good and general welfare" as declared in a Massachusetts case, the New Hampshire court affirms the "constitutional principle of equality and the reservation of private rights of the subject, which are paramount to all governmental authority."

These two states developed at the same time, had the same common interests, and were settled by the same kind of people, and yet they have come to an utterly diametrically opposed position on the question of the constitutional rights. The state of Massachusetts, with her very notable and able courts, has come to the opinion that private rights must be understood to be subject to certain paramount rights of the state; while in New Hampshire, where those of us who still remain, believe that all of the ability has not emigrated to Massachusetts, the position taken by the supreme court is that the private citizen—the subject, as they call him in the opinion—has certain rights which cannot be interfered with by any governmental authority. I am not here to define either position, but merely to point out the difficulty in dealing with a question among several states where these diverse views are about equally divided, and with all kinds of views between.

A more recent case in New Hampshire (*Bigelow vs. Whitcomb*) denies the right of the state to take without compensation trees standing within highways which are needed for shade and ornament. That, by the way, is a difficulty which the New Hampshire Society has cured by having the law amended.

There can be no doubt, in my own state, at least, that the constitution does not permit confiscation of private property or substantial interference with its lawful use, under any theory of police

power more extensive than is *necessary* for the protection of the public morals, health, and safety.

That some states will adopt the theory of the case in Maine, while others will adhere to the more conservative view, is unquestionable. The right and duty of the highest court in each state to follow its precedents in construing this fundamental law cannot be questioned or criticized by those who hold to different views. So long as the states have any rights remaining, the constitutional limitations which a state has established and recognizes for itself must be respected.

Underlying the constitutional ground is a broad principle of abstract right. As has been stated by high authority, "it is a familiar fact that the corporate conscience is ever inferior to the individual conscience—that a body of men will commit as a joint act that which every individual of them would shrink from did he feel personally responsible."

A statute imposing some measure of restraint upon timber-land owners, without ultimately depriving them of the beneficial use of their property would seem to satisfy the constitutional limitations in most of our states; and if such regulation is found to be necessary and useful in protecting the public good, it may be reasonable to expect, in time, that in other states the constitutional limitations will be enlarged to that end.

In other words, I regard constitutional objections as merely temporary, if a means can be found fairly to work out the result desired. If the constitution is not broad enough to permit an act which is proper and right and fair, I am young enough to start in to have the constitution amended wherever it needs it.

Looking at the definite question, it is my present opinion that state regulation, so far as it covers the method of cutting, treatment of tops, the matter of fire lines, comes clearly within the rule that the state may establish regulations

for the public safety; and I should expect that such regulations as that would be maintained in any state.

Whether any effectual method of regulation can be devised which will come within the principle above suggested, is a matter for experts in forestry, assisted perhaps by lawyers who are in sympathy with the policy. Imposing actual hardship and loss upon owners is not to be expected or desired. Upon this legislative question the statutes of Maine, even, remain silent. Problems of administration are unsolved. At a hearing before a legislative committee on a bill to prohibit cutting below a certain limit, an intelligent witness humorously defined the police power as providing a policeman for every woodlot. His advice to the farmers to oppose the bill was enthusiastically adopted. Enforcing regulations involves minute supervision by state agents. Rural communities resent official interference with their affairs. The necessity must be vital to recommend such a system to a legislature of practical men.

Assuming that effective regulation will involve loss to the owner, a plan of compensation through a sensible adjustment of taxation, designed to encourage timber raising, appears attractive. The complications incident to such a plan present great difficulties, perhaps impossible of solution; but the subject may be worth considering.

Taxation to-day, in my opinion, is the greatest menace to forest preservation. If I may be permitted to digress for a minute, I want to say just a word about this question of taxation, for the reason that I hinted at, and that was hinted at by the voice from the women's clubs.

One principle is absolutely sound—we all know it, and what we have to do is to make everybody else know it—and that is, that the annual taxation on a crop which is constantly increasing in value each year means confiscation of that property more certainly

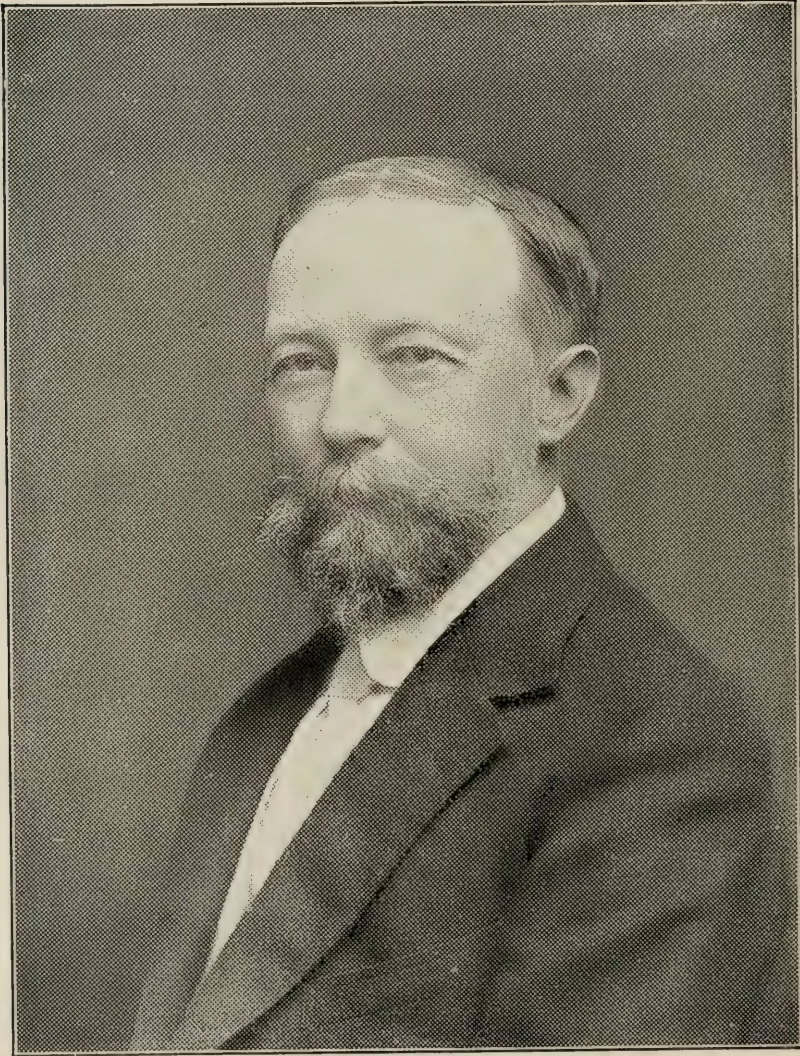
than any state regulation which I have talked about. I say that nobody can afford to plant and raise a crop that takes fifty or a hundred years to mature and pay equal and proportionate taxes during that time; because it will carry the value of that crop way beyond what it has hitherto been supposed it was worth.

What should be done is to tax the land at a practical nominal valuation, more for the sake of keeping it on the books than anything else; that is the proper method, such as \$1 an acre or even less; or at the prevailing rate applicable to all land. This method is simple and should be adopted.

I have an almost wicked desire to impose the tax when the timber is cut at so high a rate that they will never cut it. But, taking a practical view, it is my idea that that rate should be fixed at a point which will cause the owner to pay his proportion of the public burden of taxation on that class of his property lessened to a fair proportion by the benefits which he has conferred upon society by leaving the timber growing on our hillsides.

To many intelligent men the solution of the conservation problem appears to be in state or federal ownership. Some states, notably Pennsylvania and New York, have embarked upon this policy, and notwithstanding powerful opposition, the idea of federal adoption of the same principle is gaining ground. If the public good requires that the forest growth upon our mountain slopes should be preserved, for the benefit of navigation upon our rivers, or for local reasons, the nation or the state owes a solemn duty to its citizens to preserve them by the most effectual means, which is unquestionably through purchase. The obvious use of a forest as a source of timber supply bears a varying proportion to its benefits to the public health and prosperity. Owning such timber lands, the government may proceed, unhampered by private rights, to manage its prop-

erty with due regard to a supply of timber as well as the protection of the general welfare. Such a method of dealing with the matter is direct and sensible; it is worth all it costs; and the permanent burden, if any, falls where it belongs, on the public which receives the benefit.



CHARLES LATHROP PACK

For many years a life member and elected in January a Director of the American Forestry Association

FOREST CONSERVATION AND TAXATION

By CHARLES LATHROP PACK

CONSERVATION, from a question of obscurity only ten years ago, has become one of the most vital issues of to-day, an issue which is essentially economic, and which should not become political or personal. Of the many natural resources that should be conserved, there is none more important than the forest. While the Nation and the state are working to devise ways and means of conserving our forest resources, we are at the same time, in a real sense, taxing our timber to death. In those parts of the country where timber is plenty, little heed is paid to the fact that forests are a crop, just as much as grain, and when the individual owner is obliged to pay an annual tax on his growing timber, it is no wonder that he cuts, and usually cuts all. It is the most direct way of escaping practical confiscation through taxation.

Many of the states have passed laws to encourage the planting of trees. If it is a good thing for the state to thus encourage planting, it certainly is a good policy to encourage the forest owner to cut his timber conservatively, and under the best method of forest management. Two great things are

NOTE.—The foregoing article is the substance of an address delivered by Mr. Pack before the American Civic League in Washington, January 17. In this connection, we cite the resolution adopted by the American Forestry Association at its recent annual meeting:

"Resolved, That for purposes of taxation this Association approves the general policy of separating growing timber from the land upon which it stands; that the land be taxed each year and the timber only when it is cut, when a proper tax shall be paid."

Among those who have studied forest taxation there is substantial accord on the general principle.—THE EDITOR.

keeping many timber-land owners from adopting forestry methods, and these are fire and taxes.

When, by a vigorously enforced uniform law, the responsibility for carelessness which causes fire is well-fixed and enforced, as against individuals and railroads, we can properly prevent forest fires. The principle of fire laws is to prevent fires, and this principle should obtain in enforcing as well as drafting them. I believe that the only effective fire system is one where a force of trained fire wardens is provided, whose first duty is fire patrol, and who are sufficiently paid for their work.

As was stated in the report of the National Conservation Commission, from now on the relation of taxation to the permanent usefulness of the forest will be vital, and of the first importance. Our present tax laws prevent reforestation on cut-over lands and the perpetuation of existing forests by a proper use and economic cutting. The importance of the proper use of our privately owned forests becomes immediately more apparent when it is realized that forests privately owned contain at least four-fifths of the standing timber of the country. The Forest Service tells us forestry is now practised on seventy per cent of the forests publicly owned, but not on more than one per cent of the timber lands privately owned.

How are we to perpetuate our timber resources and care for the future unless the best principles of forestry are practised by the individual owner? This can be brought about best, in my judgment, by uniform laws for protection from fire and for proper taxation. We tax our forests under the general-property tax, a practise abandoned long ago by other great nations. In fact, we

are the only advanced nation with the crop of standing timber on its annual tax roll. As long as forests are taxed on the basis of an annual crop, the holding of young forests until they mature means financial loss to the owner. Under such conditions the establishment of new forests cannot be expected. I believe that the taxation of forest lands should be based upon the yield, when the timber is cut. The timber should be taxed separately from the land, and only like other crops, after it is harvested. The land alone should be taxed annually. The tax on the timber itself, when cut, and an annual tax upon the land, exclusive of the timber, is practical, certain, and fair, and well adapted to American conditions of forest investment. It would insure a permanent revenue from the forests, in place of a temporary one. Such a law would be a tremendous improvement over the

present system of taxation, which encourages and even compels forest destruction.

It is realized that the principles which are here recommended cannot be generally adopted without amendment to the constitutions of many of the states; but a growing public interest in the subject will compel such amendments and open the way for a system of forest taxation which will really encourage the holding of timber and the reforestation of lands otherwise of little economic value. In some of the states steps have already been taken to this end.

As has been well said, "it is better from every side that forest land should yield a moderate tax permanently than that it should yield an excessive revenue temporarily, and then cease to yield at all."



How shall this land be taxed to encourage maximum timber production?

THE WEEKS BILL

Report of the Majority of the House Committee in Favor of the Bill

THE report of the majority of the Committee on Agriculture of the House of Representatives on the Weeks bill "to enable any state to cooperate with any other state or states, or with the United States for the protection of the watersheds of navigable streams, and to appoint a commission for the acquisition of lands for the purpose of conserving the navigability of navigable rivers," outlines the provisions of the bill, section by section, a task already performed for its readers by AMERICAN FORESTRY. It is pointed out that the government, as the nation's representative, is amply safeguarded by the provisions of the bill, which is then discussed as follows:

Majority Report on Forest Reserves

GENERAL SCOPE

The bill is national in its scope. While its proponents have the Southern Appalachians and White Mountains in mind as the regions most vital at present, in which its principles directly apply, it will be noticed that they may be applied to any sections in which the necessity may exist or arise. It is reasonable to suppose that in the application of its principles the southern and eastern sections of the country would be given first consideration because of the greater necessity in these sections for immediate preventive and protective remedies.

The objects sought in this bill appeal to every American on grounds of broadest and most unselfish patriotism. It is the first step in the direction, and fundamental to, the great movement for the conservation of our natural resources which is the vital point around

which the constructive thought and statesmanship of the present are building for the future. It is the most practical and immediately necessary of the conservation measures that have been proposed and was strongly pointed out to be such by President Roosevelt in enunciating the conservation policy. It involves the smallest initial expenditure, the least possible future expenditure, and the surest return upon the investment, judging from the experience of every country that has practiced for a sufficient term of years a comprehensive and efficient forestry policy, of any project embodied in the conservation movement. It seeks to conserve one of the richest of our national assets from serious impairment if not destruction—our navigable waterways.

The bill involves an issue of national equity and appeals strongly to the nation's sense of equity without regard to section or party affiliation. Years ago the original states of the east obtained by purchase and cession a great national domain west of the Mississippi. Out of this domain many of the states of the west were carved and endowed with all of the rights of the original thirteen. To their development the older states contributed by liberal legislation, investments, and by the initiation of great national improvement enterprises for which the whole country, not the new states alone, contributed the funds. Finally, for the good of the whole, for the protection and welfare of the future of this western country, the nation took out of the market millions of acres of its lands, gave up its expectation of returns to the amount of over \$400,000,000, in which all would have shared, in order that beneficent forests might be main-

tained in perpetuity in the western mountains, that a supply of timber might be assured for all time to the people of these states, and that the necessary flow of their streams might be maintained.

In the meanwhile, the crowding of civilization, the insistent demands of the market, the wasteful manner of handling and the ravages of fire had been devastating the southern and eastern mountains, which had passed into private ownership long before it was realized that there could ever come a time when the necessity of conserving the natural resources of this rich country would become an issue of supreme importance alike to the present and the future. Not only was the timber supply threatened with exhaustion, but the flow of numerous rivers, whose water-powers furnish so much of wealth and employment, was in jeopardy, and, through erosion, silting, and irregular flow, the navigability of many of them was endangered. The plea of the people of the northeast and southeast for relief was brought to Congress more than a decade ago, and is now before Congress in this bill.

Along with the national irrigation work of the west, the hundred and ninety-odd million of acres of national forests in that same section, the gift to the world of the Panama Canal, these people of the south and east appeal for the expenditure—more properly investment—of a few million dollars conservatively applied to initiate in their mountains a conservation enterprise which is in line with the past policy of the nation in other directions, and of every first-class power in the world. It is a movement which the states themselves are unable to initiate. They have neither the power nor the resources, nor is it a duty which they alone can be asked to assume. Every state of every section will benefit by the conserving of the timber supply, water powers and navigable streams of our southern and eastern mountains. It is a national duty which neither in equity nor wisdom this Congress can longer shirk.

Every year of delay increases the loss of our resources in these regions. Each year of postponement of action adds to the loss and the ultimate expenditure which shall have to be made when necessity forces us ultimately to acquire and control these forests. It is a short-sighted policy which blinds us to the lessons of history and the experience of other and older countries.

OTHER COUNTRIES HAVE BEEN FORCED TO THE CONTROL OF MOUNTAIN FORESTS

In dealing with mountain watersheds, European countries years ago faced the problems which now confront the United States. Almost without exception, they have passed through three stages in their treatment of mountain forests. Unrestricted individual ownership was the first stage, and this plan uniformly failed. In France, following the revolution, unrestricted private control prevailed until 1803. By that time, fire, cutting, pasturage, and improper tillage in the mountains had caused the ruin or serious damage of eight hundred thousand acres of valley farm lands on account of debris carried down by the mountain torrents.

Individual ownership with government regulation as to cutting and fire protection, was the second stage. Italy thoroughly tried this plan from 1877 to 1888, and abandoned it because of the difficulty of enforcement. Enforcement of the laws was constantly vitiated by political exigencies. The experience of Italy was practically the experience of all other European countries and government regulation of private forests is now in effect only as an adjunct of government ownership of the more important areas.

Government ownership of a portion of the protective forests of the mountains and government supervision over the balance is the third stage which has been in effect for more than a quarter of a century in all of the leading countries of Europe. Of all the plans, this is the only one that has been entirely successful. Erosion of mountain soils has been reduced to the minimum, the

flow of streams has been equalized, and the forests have become a source of profit. In Germany the average net income per acre from the forests is \$2.40 a year, while in the well-managed state and communal forests of Switzerland the net annual income per acre is from \$3 to \$6.50 per acre, and in some of the city forests it reaches from \$8 to \$9.

In no country of Europe does the government own all or a large part of the forests, nor is a different plan undertaken in this bill. In many instances it owns only a small per cent. Even in Germany, where forestry is most highly developed, the crown and state forests amount to but thirty-three and seven-tenths per cent of the total. Much belongs to towns, corporations, and individuals. Several countries are actively purchasing waste lands and restoring the forests by planting. Up to 1900 France had bought 400,000 acres, of which 218,000 acres had been planted. She continues to acquire land at the rate of 25,000 to 30,000 acres per year. Sweden during the past thirty years has purchased 600,000 acres at an average cost of \$5.30 per acre.

It is the ownership of protective mountain forests that is sought by the state. Their influence on the silting up and flow of streams is not only conceded, but is recognized as the foundation of the state forest systems of Europe, by the highest engineering and forestry authorities.

The experience of the countries of Europe, reaching back for over a hundred years, without exception, points a course which our government, looking beyond the immediate present, cannot afford to ignore. It is fortunate for us that by immediate action, we can avoid the enormous expense of reforestation necessary in the forest policies of European countries, where a large part of the expense is due to planting on lands where the natural forest has been exterminated. In the United States at this time, the problem is not one of reforestation, but of protecting and using wisely the forests which nature has provided; it is not a question of the creation of forests, but of the

conservation of those we have already. The enactment of this bill into law, we confidently believe will save us from the fatal errors and heavy burdens of European countries in dealing with this problem.

FOREST INFLUENCES ON STREAM FLOW

Your committee, having in view the importance of a thorough investigation of the claims for and against forest preservation in relation to its functions as a conservator of water in aid of navigation, has had before it in numerous hearings during this and past Congresses, many distinguished authorities to give their views and conclusions on this question.

Much valuable data and expert opinion concerning American and European conditions have been brought to the attention of your committee.

The problem is recognized by the best opinions to be a difficult one, but the most exhaustive symposium held upon the subject, from an engineering and forestry point of view, was undoubtedly the International Congress of Navigation, held at Milan, 1905, at which the general subject of forest influences upon streamflow was presented and discussed by a number of eminent and able men, these being:

1. Mr. H. Keller, privy councillor of the public works department, Austria.
2. Mr. H. N. Lafosse, inspector of rivers and forests, France.
3. Mr. V. Lokhtine, Russia.
4. Mr. Ponti, engineer in chief of the *genio civile*, Italy.
5. Mr. J. Riedel, engineer, technical councillor, at Vienna.
6. Mr. J. Wolfschutz, agricultural councillor, Austria.
7. Mr. E. Lauda, director of the royal hydrographic office at Vienna.

The conclusions advanced by these authorities have been summarized carefully by Mr. Cipolletti, a prominent Italian engineer, in his official summary of the inland navigation section of the congress, in these words:

"First. Opinions being unanimous upon the point that forests exert a beneficial influence:

"(a) Upon the consolidation of sloping grounds by preventing the disastrous washing off of materials to the bottom of the valley;

"(b) Upon the formation and permanency of springs, at least in impermeable ground and on slopes;

"(c) Upon the better régime of rivers at least at the period of their low-water and ordinary flows."

Your committee prefer, however, that these men should speak for themselves. Mr. Keller says: "In many places and especially in the Mediterranean Basin and outlying districts, injurious changes have occurred in the nature of the soil, owing to deforestation, and in some special cases owing to the formation of swamps. These changes have had unfortunate consequences, among others an alteration in the regimen and flow of waters."

Mr. Lafosse says: "The effect of the destruction of forests, especially of the woods on mountains, is to hurt the regimen of rivers and to lessen their discharge."

Mr. Lokhtine says: "Forests form a beneficent factor, acting favorably on the general abundance of water in a country and particularly on the supply of springs and rivers; that is why the destruction of forests should be considered as hurtful and dangerous."

Mr. Ponti says: "Forests are always effective for holding steep slopes; they are powerful auxiliaries for any kind of work carried on with the object of reducing the volume of material which the water may carry off. * * * Forests retard the flow of the rain to the bed of the river and reduce its volume."

Mr. Riedel says: "Is it necessary over and over again to draw attention to the circumstance that the meteoric waters flow from the deforested slopes as from the roof of a house, while in forested expanses a large proportion of the moisture brought by the rain is caught by the crowns of the trees, partly to evaporate and partly to fall slowly to the ground, that it has more time than that which strikes the latter

direct to sink into the soil and supply an enduring feed to the springs?"

Mr. Wolfschutz says: "When we sum up these discussions we come to the conclusion that the existence of forests and swamps will on the whole have a favorable influence on the water régime."

Mr. Lauda, who has been extensively quoted in respect to certain observations regarding floods in the Danube and Seine, said at this congress: "First, precipitation, retention, and discharge are connected by certain laws; second, the forest exerts an influence in any case on the flow of water; third, the retention of the water precipitated is, in a certain measure, greater in the more than in the less wooded basin."

And again he says: "A final judgment on the subject of the influence of forests on the regimen of streams cannot be uttered, the experimental data possessed so far covering only a relatively short space of time."

And again: "The general utility of the forests is so well settled * * * as a means of protecting the soil against earth slides * * * in reducing the amount of sediment carried by the rivers, so important that these reasons alone justify fully the greatest possible promotion of forest cover."

These conclusions are in harmony with the opinions of a majority of engineers and expert foresters who have appeared personally before your committee and are in exact accord with the views of the American Institute of Electrical Engineers, composed of 6,300 members, and the American Society of Civil Engineers, with a membership of over 4,500, both recognized as the leading organizations of their kind in the world. In resolutions presented by them to the Agricultural Committee in January, 1908, their views upon the effect of forests on the regularity of streamflow are unequivocally set forth.

RESOLUTION OF THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

WHEREAS the value of water powers is determined in great measure by regularity of flow of streams, which regularity is seriously impaired by the removal of forest cover at

the headwaters, with the resulting diminution in the natural storage capacity of the watershed, this impairment frequently being permanent because of the impossibility of reforestation owing to the destruction of essential elements of the soil by fire and its loss by erosion; therefore, be it

Resolved, That it is the opinion of the American Institute of Electrical Engineers that the attention of the national and state governments should be called to the importance of taking such immediate action as may be necessary to protect the headwaters of important streams from deforestation, and to secure through the introduction of scientific forestry and the elimination of forest fires the protection of the timber supply.

RESOLUTION OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

WHEREAS the timber resources of this country are being rapidly diminished, owing to unscientific methods of forestry, to the prevalence of forest fires, and to a wasteful use of timber, resulting in a steady increase in the cost of both hard and soft wood, and which may result, moreover, in the diminution of the natural storage capacity of our streams, and increasing irregularity of flow, and consequent impairment in the value of our water powers;

Resolved, That in the opinion of the board of direction of the American Society of Civil Engineers every endeavor should be made to further the introduction of principles of scientific forestry and the creation and preservation of national and state forest preserves, and in particular the board of direction approves and urges the passage by Congress of a bill providing for national forest reserves in the Southern Appalachian and White Mountains.

In view, therefore, of the almost unanimous consensus of scientific thought, coupled with the common-sense judgment of practical men, your committee feels warranted in accepting as fundamentally correct:

1. That a forest cover is of great value in retarding run-off, and in mountain regions contributes more directly and in a more beneficial manner to the underground waters than any other single agency.

2. That a forested watershed exerts an appreciable and beneficial influence upon the run-off, by maintaining longer periods of average flow, thereby lessening tendencies both to low and high water.

3. That on sloping ground, and especially on the steeper and longer

slopes, prevailing in mountain regions, the forest is of first importance in preventing soil erosion and consequent silting of streams by the detritus from such slopes, this detritus, when formed, finally reaching, as is well established and undisputed, the lower reaches of streams, causing changes in river beds, building up sandbars and other obstructions to navigation.

FOREST DESTRUCTION IN SOUTHERN AND EASTERN MOUNTAINS

The testimony before the committee is abundant and convincing to the effect that the destruction of forests in the Southern Appalachians and White Mountains is going on at an alarming rate. Wasteful and unscientific lumbering, followed by forest fires, the effort to cultivate the land upon the steep slopes of the mountains, are serving to bring about a condition which, unless checked, must inevitably result in the exhaustion of the timber supply of the south and east, the destruction of their splendid water powers, and ultimately, in a serious hindrance to the navigation of our inland waterways.

GENERAL CONCLUSION

Your committee believes that there is no more important bill before this body than this which we here report. It involves the agricultural, industrial, and commercial future of the sections to which it is most immediately directed. Its favorable consideration is urged by as large a number of organizations, business, scientific, and civic, as ever gave support to any proposition pending before us. Favor is asked for it by the business interests of the country which recognize that continuance of industrial development for the future must depend upon the conservation rather than upon the exploitation of our natural resources. It is supported by a class of people whose achievements make up the industrial glory of the nation, and whose judgment, therefore, is entitled to most serious and patient consideration.

No organization of any kind, no committee, legislative or otherwise; no body of men, legislative or otherwise, has ever acted otherwise than favorably upon the principles involved in this bill. Numerous senate and house committees of this Congress have reported it favorably to their respective bodies. Three times it passed the senate and in the last Congress passed the house by a substantial majority. Three Presidents—McKinley, Roosevelt, and Taft—have been its outspoken advocates. It has received the endorsement of every President of the country since agitation in its behalf was begun. The almost unanimous sentiment of the progressive citizens of the country demands favorable action upon it at our hands. Further delay cannot be justified in view of the facts in possession of your committee. They warrant immediate action; the country expects it.



The above report has the approval of the following eleven members of the House Committee on Agriculture:

WILLIAM W. COCKS, *First New York District.*

RALPH D. COLE, *Eighth Ohio District.*

JAMES C. McLAUGHLIN, *Ninth Michigan District.*

CHARLES C. PRATT, *Fourteenth Pennsylvania District.*

L. B. HANNA, *North Dakota.*

FRANK PLUMLEY, *Second Vermont District.*

JOHN LAMB, *Third Virginia District.*

ASBURY F. LEVER, *Seventh South Carolina District.*

AUGUSTUS O. STANLEY, *Second Kentucky District.*

GORDON LEE, *Seventh Georgia District.*

JAMES T. McDERMOTT, *Fourth Illinois District.*

The minority report, dissenting from these views, is signed by:

CHARLES F. SCOTT, *Second Kansas District.*

GILBERT N. HAUGEN, *Fourth Iowa District.*

WILLIS C. HAWLEY, *First Oregon District.*

JOSEPH HOWELL, *Utah.*

PLEASANT T. CHAPMAN, *Twenty-fourth Illinois District.*

JACK BEALL, *Fifth Texas District.*

WILLIAM W. RUCKER, *Second Missouri District.*

In an editorial on another page some comments are made upon the minority's statement of the case which will suggest a reason for not printing it in full. The report is so misleading that it needs to be checked by comparison with the records. As our readers would hardly have patience for this task, and there is not space to make the necessary annotations here, it is necessary to leave it with such comment as is made in the editorial above mentioned.

One statement made by the minority must be corrected, for it is untrue, and it illustrates well the disregard of facts with which the report was prepared. The statement is made that "when this project was originally proposed, it included only the Appalachian Mountains, but the bill introduced to carry it into effect even then called for an appropriation of \$10,000,000. Later the plan was broadened to include the White Mountains, and then a bill was introduced asking for \$30,000,000."

No bill has been introduced appropriating any such amount as that last named, and the chairman of the committee, who signed the minority report, ought to know it. The largest appropriation in any of the Appalachian bills was that carried by the Weeks bill as passed by the House last year. That was a continuing appropriation and would have totaled \$21,000,000 in ten years.

It may be added that the supporters of this legislation have contended from the first that every year of delay would increase the ultimate cost to the nation of what would have to be done sooner or later.

EDITORIAL

Taxation the Primary Issue

THE discussion of state regulation of timber cutting at the annual meeting of the American Forestry Association brought out some interesting points. Not the least of these was the conclusion, reached by both Mr. Cary and Mr. Hollis, whose papers are published in our pages this month, and agreed to by several who took part in the general discussion, that state regulation would be unjust, impracticable, and unconstitutional, unless preceded by a reform in methods of taxing forest lands. The argument, made from different angles of approach, seems unanswerable, that for the state to place a cumulative tax on growing timber and then to undertake to restrict and regulate its use may and often would amount to practical confiscation.

An equitable adjustment of taxation must, therefore, precede any legislation looking to state regulation of the management of timber crops.

Mr. Hollis, who in his paper presented the subject from a lawyer's viewpoint, added an illuminating appendix in the discussion that followed, when he argued on somewhat broader grounds. After explaining that in his paper he undertook "to define the condition of the question as it stands on the authorities to-day," he said that his "conclusion as a citizen would be that whatever regulation of forest cutting is necessary and useful for the protection of the public welfare ought to be introduced now or before a great while," even if it required constitutional changes. Turning, then, to taxation, Mr. Hollis made the further points that taxation on potential values, after the German method, is impracticable in this country because forest production is not sufficiently systematized. The taxation system must be made attractive to private owners. The low market value of timber, until recently, and the moderation of boards of assessors are

the reasons why the baneful effects of the present scheme of taxation have not been more keenly felt hitherto; but the study of forest taxation in New Hampshire by Mr. Foster, of the United States Forest Service, showed that in that state, which is not exceptional in this regard, timberlands were taxed at from three to 150 per cent of their actual market value, a condition very satisfactory to the three per cent owners, but far from that to the owners at the other extreme.

The system proposed by Mr. Hollis was generally stated at follows: "Tax the land merely what it is worth under all circumstances, varying as it will by climate, location, soil, and the like * * * when we come to tax the timber itself * * * taking a share of the gross income which will represent the same share of the gross income from other property." While he regarded this due proportion as not clearly worked out, Mr. Hollis personally estimated it at about twenty per cent.

Mr. George H. Maxwell declared his belief "that the establishment in every state of a right system of forest taxation would do more than anything else to develop rapidly the creation of new forest plantations and the better care of those already existing that have not already grown to maturity." Mr. Maxwell divided forest property into three classes—the land, the growing timber, and the matured timber. The land value is easily ascertained, the growing trees that have not reached their maximum value should not be taxed, but the matured trees should be taxed. In reply to a question by Mr. Ayres as to who will determine when the timber is mature, Mr. Maxwell said there is no other way except by state or local tax collectors or commissions. We must simply do the best we can, as we do with other assessments. Mr. Maxwell took the same

position as the other speakers in regard to the relation of taxation to state regulation, and made an argument for the feasibility and desirability of some form of state regulation under a proper and equitable scheme of taxation. That is another story, so far as our present purpose is concerned, which is to show the uniform trend of the discussion in its bearing on taxation. Mr. Pack's brief paper, which we publish, runs along the same line.

The idea in regard to the fundamental plan of taxation advanced by all of these gentlemen coincides with that embodied in recent platforms of the American Forestry Association and other organizations, including the able discussions before the International Tax Conference. This essential unanimity shows that the thinking upon this question during the last two or three years has brought about a rapid clarifying of ideas. The next thing is to make the conclusions that have been arrived at effective through legislation. This means that we must carry further the knowledge of the principles that relate to forest taxation, so that public opinion will become active on the subject. In Massachusetts the question has been brought forward in an attempt to have an amendment to the constitution introduced, permitting the classification of property for purposes of taxation. In the arguments on this proposition before the special commission the subject of forest taxation played a prominent part.* The commission, much to the surprise of the people of the state, reported against the amendment, but the fight is still on and will probably ultimately be won. When it is there is every likelihood that Massachusetts will add a modern taxation measure to its growing body of excellent forest law. There are many other states, however, in which action on this point is even more important to the forest interests of the country. Here, also, is a subject that may properly interest the enthusiasts for uniform legis-

lation, for it is a field in which uniformity would be beneficial.



The Need of Private Forestry

THE Chief of the Forest Service made an important contribution to the discussion of that phase of the forest problem that relates to the practice of forestry on private holdings in an address to the National Lumber Dealers' Association in New Orleans, on the 10th of April. We have always urged that the forest problem involves the elements of national, state, municipal, and individual action. A common fault of the American people is to depend too much upon legislation to settle all of their difficulties, and it is well for us to be reminded sometimes of the duties and the opportunities of the individual. This Mr. Graves did in the address to which we refer.

"The more I study into this subject of private forestry," he said, "the more I am convinced that what is needed is not immediate legislation, but an immediate beginning of the practical operation of forestry, and I am convinced that the results of such a beginning will be conclusive evidence that American lumbermen are fully capable of meeting the conservation problem both from the standpoint of the permanent requirements of the lumber trade and from that of the continued prosperity of the public at large."

Mr. Graves, however, is no doctrinaire, and cherishes no illusions in regard to the immediate results. He said that the immediate general application of scientific forestry over large holdings would not be practical because it would involve a considerable investment with no certainty as to the returns to be expected, and it is also necessary that a preliminary working out of methods of cutting and fire protection should be had. Mr. Graves is not only cautious, but he is also definite and constructive in his recommendations and, as might have been expected, he has a program to propose:

(1) That those lumbermen who are interested in this matter make an immediate test of the practice of forestry on their holdings;

*In this connection a statement recently made by Henry James, Jr., of the Massachusetts Forestry Association, is of interest. It will be found on another page.

(2) that this be regarded as a beginning with a view of ascertaining the possibility of forestry, rather than an attempt to establish an organized system of forestry over their entire holdings; (3) that to accomplish this object they associate themselves together, either through their trade associations, or by a new association, in order that through cooperation and partnership the expenses of forestry may be reduced to a minimum; (4) that each owner set aside from 1,000 to 10,000 acres as a practical demonstration ground; (5) that there be employed by the association a forester to direct the technical work, his salary and expenses to be properly prorated among all the members; (6) that each owner employ such local guards or rangers as are necessary to carry out the fire regulations, restrictions of cuttings, etc.

Another significant point in his address was the warning that if the lumbermen do not themselves take up this matter, the public, following the present tendency toward restrictive legislation, will take it in hand. "My own program," he said, "would be for the private owners to recognize that they have a responsibility to handle the property so that it will not result in an impoverishment of a state, and that the state should recognize its responsibility to aid the private owners in carrying out the necessary conservative management."

This falls in very appropriately with the discussion of state regulation of timber cutting, which is printed in the pages of *AMERICAN FORESTRY* this month.

While there is an opening for forestry with early returns through leaving the small timber for a second cut, Mr. Graves pointed out that real forestry demands that reproduction be provided for. The long-time investment involved in planting trees on deforested land is not under average conditions attractive to lumbermen and Mr. Graves did not urge it. On this, again, his advice was practical and to the point:

If you should ask my advice as to whether you should buy denuded lands in the south and plant them on a large scale as an investment, I should advise against it. In my judgment the question of the financial returns from private forestry should not be looked at from a theoretical standpoint of purchasing land and planting trees, but rather from the standpoint of the management of forests already under timber. I believe that the

average American lumberman is not much more interested in natural reproduction than he is in plantations. Nevertheless, I believe that the question of reproduction is well worth your attention on practical grounds, even though you have not the interest of the owners who are planning a heritage for their children and grandchildren, or of the corporations organized on such a permanent basis as to look far into the future. Already in the best settled portions of our country land well stocked with young growth brings a higher price than denuded land. Even the land speculator who has no interest in permanent forestry may well take this into account. Reproduction can be secured naturally in most cases where a second cut is contemplated. I believe that it is emphatically worth while, in the first place, for the sake of the increased sale value of natural forest land after the present stand has been removed, if it is then well stocked with young growth. In the second place, I believe that the permanent interests of the lumber business not only justify but demand such a handling of your forest property.

When such sound advice as this is taken to heart by the lumbermen of the United States we shall be very much nearer the solution of our forestry problems than we are today and this great industry, one of our greatest, will be on a much sounder basis than it is at present, with our diminishing timber supply.

It may perhaps be added that while Mr. Graves did not recommend extensive planting to the lumbermen as a business venture, a large amount of planting must be done to secure the future, at least in the eastern United States, and as it is not attractive for the individual, the state must come in here, to do what the individual cannot do.



Misrepresentation

The report of the minority of the House Committee on Agriculture on the Weeks Bill contains certain misrepresentations of fact so palpable that it seems impossible that they could have been put into a report, presumably prepared with some care, without deliberate intent.

For example, the statement that the consensus of expert opinion of the engineers of the world is to the effect that deforestation or reforestation of a

watershed at the source of navigable rivers is a negligible factor in the maintenance of such navigability, ignores the testimony of the able and competent engineers who have appeared before the committee in behalf of the Weeks bill, ignores the discussion of the Milan navigation congress of 1905, the facts regarding which were laid before the committee *in extenso*; ignores even the testimony of one of their own star witnesses, Colonel Bixby, of the United States Engineering Corps. Colonel Bixby testified before the committee: "The net result of that discussion has been up to the present time among all the technical men, the engineering fraternity: It is a draw-off as to whether forests affect navigation at all. There are some who think they do and there are some who think they do not. There are isolated cases where it is quite apparent to some people that there is a local benefit, and there are also isolated cases where it is equally apparent that there is not. So far, up to the present day, every meeting of technical men, every meeting of engineers all over Europe, as well as in the United States, has resulted in a drawn game as to whether the forests did affect navigation or whether they did not."

In the face of this, the minority coolly make the statement above referred to. This is also in the face of the additional fact that the committee has had before it the official expression on this matter of the American Society of Civil Engineers and the American Institute of Electrical Engineers, representing about 10,000 engineers in this country, and this expression stands counter to that of the army engineers whose testimony the minority cite with such favor. This certainly puts the Engineer Corps in an unpleasant position. The army engineers are gentlemen and officers of intelligence and professional competence. How do they like being made to appear as assuming to be the sole authorities in professional matters? We cannot believe that Colonel Chittenden, Colonel Bixby, Major Cavanaugh, Captain Johnston, or any other officer of the corps, would willingly be put in

such a light. And then it has been shown that even in the corps there is a difference of opinion.

The attempt of the minority to make it appear that the advocates of the theory of forest regulation are impracticable theorists and men of no experience is an unworthy one and shows that the minority know that they are advocating a bad cause and dare not recognize the truth. The men who have testified in favor of the Weeks bill are practical men of wide experience. Swain and Lee and Schoen and Van Hise and Roth and Glenn and others who have testified on the same side, are as competent as any who have been put on against the bill. Have any been found on the side of the opposition except the army engineers, whose testimony contains many admissions and qualifications which the minority do not dare to use, and the chief of the Weather Bureau, whose competence in this particular field has been shown to be simply nil?

Note in contrast the fulsome comments of the minority upon their own witnesses. Colonel Bixby stated in regard to his own experience: "I have not, of course, been specially at work on that branch of the service of forestry. My knowledge of it comes simply in connection with my own study of river and harbor improvements on which I have been engaged in active practice in charge of districts ever since 1884. I have a little theoretical knowledge of the subject, because several years prior to that time I went abroad to study and went to the French National School of Bridges and Highways and through their entire course."

In view of these facts, as stated by Colonel Bixby, is the minority justified in saying: "If anybody in the United States, or indeed in the whole world, is entitled to speak with authority upon the fundamental proposition of the bill under consideration, it is Colonel Bixby, for the testimony before the Committee on Agriculture shows that for more than thirty years he has studied the question of forestation as relating to streamflow and has read every impor-

tant paper that has been written upon it during that time in this country and in Europe?"

We do not find the committee anxious to quote Major Cavanaugh, whose testimony, we may assume, was somewhat disappointing in the admissions he made that were distinctly favorable to the influence of forests upon the flow of streams.

These are samples of the one-sided arguments running all through the report of the minority. If it were fair and honest, if they even quoted their own witnesses fully and frankly, their discussion might be a real contribution to the subject. But their own unfairness precludes that.



The Case of the Hetch-Hetchy

UNTIL the agitation with regard to its occupancy as a reservoir for the city of San Francisco began a short time ago, it is doubtful if many people in the United States knew anything about the Hetch-Hetchy Valley and its wonderful beauty. Even now there are many misconceptions in regard to it. Because it is a national possession and because a principle is involved in the present fight for possession, we publish this month a brief description by John Muir with some illustrations which suggest as well as such pictures can the picturesque grandeur of this annex of the more famous Yosemite.

The Hetch-Hetchy Valley is distinct from the Yosemite Valley, but it is a part of the Yosemite National Park and receives practically all of the drainage of the Tuolumne Basin. The Yosemite Valley had already been preserved for some time as a state park when the Yosemite National Park was created in 1890 by Congress for the especial purpose of protecting the Hetch-Hetchy Valley and the Tuolumne Meadows.

Some time ago the city of San Francisco became involved in a controversy with the Spring Valley Water Company, which furnished the water supply of the city, and cast about for a source

for a municipal supply. The Hetch-Hetchy Valley seemed to offer an opportunity to secure such a supply at small expense through a national grant. The building of a dam would create here a large reservoir and would also furnish water power that might be made profitable for the city. An application was made to the Secretary of the Interior, Mr. Hitchcock, and, after giving it careful consideration, he refused to grant the rights desired. This was on the 20th of January, 1903, and a rehearing was given in December of the same year, when the request of the city was again refused. An attempt was made to overrule the Secretary's decision by introducing a bill in Congress, but the Committee on Public Lands likewise refused to recognize the wishes of the city. The matter was taken to the President and referred by him to the Secretary of Commerce and Labor, Mr. Metcalf, himself a citizen of California. Mr. Metcalf supported Secretary Hitchcock in his denial of the right of the city to enter a national park. When Mr. Garfield became the Secretary of the Interior, the San Franciscans applied again for the permit which had been refused them, and on the 11th of May, 1908, Secretary Garfield, on the ground of the need of the city, rendered a decision such as San Francisco had been seeking for. The ultimate authority lay in Congress, however, and whatever power the Secretary might have—and that power was open to question—any grant made by him was revocable by any other Secretary of the Interior. In order to secure beyond doubt the privileges granted in the permit by Secretary Garfield, San Francisco applied to Congress in December, 1908, to confirm and make permanent the Secretary's action. The matter was referred to the Committee on Public Lands and in the House committee the vote upon the question was a tie. The Senate committee was known to be unfavorable to the bill, and therefore no attempt was made to pass it in the Sixtieth Congress. The bill has been reintroduced in the present Congress. There will be a hearing

before the Secretary of the Interior on the eighteenth of May. In the meantime, on the strength of the report of government engineers, Secretary Ballinger has reviewed the action of his predecessor, and may perhaps, it is thought, reverse it.

It is not our purpose to discuss the evidence in this case, or to present the facts in detail, but only to call attention to the issue which is presented. If the city of San Francisco were dependent upon the Hetch-Hetchy Valley for a pure water supply there would be no question but that it would be the duty of the nation to sacrifice this valley, which it is preserving as a monument of beauty and a pleasure ground for the people, to the practical need of the great city which lies near it. But if, on the other hand, there are other sources available for the San Francisco water supply, even if they will cost the city more money than it would cost to obtain the Hetch-Hetchy from the national government, the issue is an entirely different one. Then it becomes not a question of the need of San Francisco, but a question between the rights of the people and especially of the rest of the state of California, and an opportunity for San Francisco to obtain a water supply at a bargain through the sacrifice of one of the remarkable beauty spots in which California takes such just pride.

It is the testimony of many engineers, including those detailed by the Interior Department to examine into the merits of the case, that there are other water supplies equally available for the city. It is, indeed, claimed that no large city in the world has so many opportunities of this kind around it, and something like a score have been enumerated. If this is true—and this is a question of fact which can easily be determined by the engineering testimony—there is no possible excuse for the invasion of a national park. California has been glad to have the Yosemite country secured for all time under the safeguard of national control; it has sought for national aid in preserving its big trees from the lumberman; but such action is a mere

farce if the territory included in these parks can be resumed at any time when it suits the desires and the economies of an individual, a municipality, or a state.

This, then, is the issue that is put plainly before the country by the case of the Hetch-Hetchy Valley: Whether the integrity of the national park system shall be preserved or not. If it was worth while to establish the system, and to secure for the permanent enjoyment of our people under the protection of the national government our noteworthy bits of natural scenery, it is certainly worth while that the guarantee so given should be maintained in its integrity. The only possible excuse for its violation is the necessity of the people, and it has not been proved in this case that such necessity exists.



Let Us Err on the Safe Side

COL. EDWARD BURR is quoted as authority for the statement that it would require observation for a period of not less than sixty years to determine the effect, favorable or unfavorable, of deforestation on stream-flow. If this is the case, which is fairly open to question in the face of the world's experience, and since even the engineers who do not believe that forests are beneficial in this connection, admit that the question is in doubt, is it not wise to spend some money now to save such protective forests as we have and to put ourselves on the safe side, rather than to risk the heavy expense and serious loss that may come in the future if, perchance, the belief of a large part of the civilized world and the engineering profession is right and there is something in the protective-forest theory?

Every one of these engineers who believe that forests do not affect the navigability of streams believes in maintaining forests for other reasons—which are sufficient in themselves. Many other authorities equally good believe that forests aid in maintaining good stream conditions.

Why, then, take any risks? Because some doubt, shall we save a few millions now and risk the loss of many millions later? Other nations have had the experience. Shall we fail to profit by what Germany, France, and Italy have learned and paid for, simply because able men who have guarded the lower reaches of our rivers do not believe they are affected by the waters that come from higher up on the watersheds?

Shall we follow the advice of the eminent engineer who suggests the cultivation of clover on the side of the Appalachian Mountains as a better restrainer of floods than the forests? His engineering ability is not open to question, but he has certainly not followed the plough, or he is not familiar with the Appalachian mountainsides.

No, let us make our domain secure again all possible contingencies and take no chances on doubtful, negative theories.

It Makes a Difference Where the Appropriation Goes

WE LEARN from a Salt Lake paper that Congressman Joseph Howell of Utah has assured his constituents that he will use his influence in securing the passage of the \$13,000,000 reclamation bond bill, and that it will be supported by the representatives from all the other states having arid regions. Mr. Howell is one of the members of the House Committee on Agriculture who is consistent in his opposition to the Appalachian forest project. It seems that his views of the necessity of economy do not extend to projects affecting the state of Utah. We earnestly commend for Mr. Howell's consideration a broader national view. We wish he might be led to see that there are needs of the eastern states which are a responsibility of the nation just as much as the needs of the western states, and that eastern senators and congressmen will be unwilling forever to support measures for the improvement and development of the

west when their western colleagues refuse such support to measures equally necessary for the maintenance of the welfare and prosperity of the east.

We do not wish in saying this to be understood as threatening retaliation or as wishing to raise a sectional issue. The opposite is true. We stand for the broadest nationality. The interests advocated by this magazine are the interests of the east, the west, the north, and the south, and it has no preference between them. We are simply calling attention to the national injustice involved in the attitude of some of the western men who are absorbed in securing all that they can for their own section without any regard to the needs of the rest of the country.

Our Commonwealths' Neglected Opportunities

IN THE *Denver Post* we find an article commenting on a paper read before the Colorado Conservation Commission which makes a point so applicable in all parts of the United States and so well stated that we quote it here. The paper urged greater activity and larger initiative on the part of the western states in the conservation of their own natural resources. The *Post* remarks that the defect of this argument is that it has been presented after the adjudication of the cause, and then goes on to say:

Mr. Gauss is not as a voice calling in the wilderness; he is sounding the charge after the surrender. In the matter of scientific conservation the western states—as we pointed out on this page a year ago—have “slept on their rights,” and their opportunities. Colorado *could* have constructed the Gunnison tunnel; but Colorado relinquished that to the national government. Colorado *could* have inaugurated and organized an efficient forest service; but Colorado failed in that also. Colorado *could* have so amended its constitution that its revenues would have been equal to support adequately its own institutions of public education, for example; but there again we failed to take due advantage of our occasions. It is a problem in human nature, in the limitations of human activity, that we are here confronted by, rather than a doctrine of governmental machinery; and this country is no longer a con-

geries of independent commonwealths united by a common agreement for limited purposes, but a cohering nation, in which it seems probable as time evolves new conditions, that the importance of the states, as states under the original conception, will diminish, and the nation become "more and more." We do not claim that as an ideal finality; but it seems to us to be the only conclusion deducible from the logic of history.

What is true of Colorado and of other western states is true likewise of the eastern states. It has often, for instance, been urged against the claims of the White Mountains for preservation at the hands of the nation that New Hampshire might easily have preserved the White Mountain forests herself and thereby added to the wealth of the state. This is entirely true, but years

ago, when the questions of forestry and conservation had not come to the front as they have now, New Hampshire parted with her title to the mountains, and the situation that confronts us now is the situation that has been created by later conditions of ownership and business. It is no use now to claim that New Hampshire *could* have done this; the time for that has gone by. It has now become a problem which must be taken in hand by a greater power than New Hampshire, and this is only one illustration of the many that might be given. The *Post* is perfectly correct in its position and the fact that it states is only an illustration of a way in which our system of semi-independent commonwealths fails at critical points.



NATIONAL FOREST WORK

The New Forest Products Laboratory

The new forest products laboratory at Madison, Wis., is completed and will be formally opened June 4. William L. Hall, chief of the forest products division of the Forest Service, will move his headquarters from Washington to Madison. The laboratory has been established to aid, through experiments and demonstrations, the lessening of waste in the manufacture and use of wood. It is a cooperative undertaking between the United States Department of Agriculture and the University of Wisconsin. The state has erected for the purpose a new building at the university and will furnish also the light, heat, and power. The Department of Agriculture has supplied the equipment and apparatus and will maintain the force of thirty-five or forty persons required to carry on the work. Through this arrangement, the United States has secured perhaps the largest and best equipped wood testing laboratory in the world.

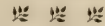
A number of vacancies in engineering positions in connection with the work will be filled in May and June. Among these are positions of engineer in wood preservation, engineer in timber testing, and chemical engineering. These positions will be given to men with a basis of thorough engineering training, or two or three years' experience in practical work.

The laboratory will be prepared to make tests on the strength and other properties of wood, to investigate the processes of treating timber to prevent destruction by decay and other causes, to study the saving of wood refuse by distillation processes, to examine the fiber of various woods for paper and other purposes, and to determine the influence of the microscopic structure of wood on its characteristics and properties. Facilities are at hand, in fact, for almost any kind of test on wood that practical conditions may require.

Lumber manufacturing and wood-using industries are keenly interested in the work on account of its practical bearing on reducing waste of wood—to them a subject of vital concern. Already they have proposed many experiments and supplied much testing material, which is awaiting attention.

Many prominent men of the lumbering and wood-using industries have signified their intention to attend on the day of the opening. Several organizations expect to hold directors' meetings or conferences at that time to consider, among other matters, plans for making wide practical use of the labora-

tory. A short, appropriate general program will be arranged, and there will be a systematic inspection of the laboratory, with demonstration work in progress at the time. The entire exercises will occupy but one day, and visitors will be able to return to Chicago the same evening.



The Ratio of Manufactured to Rough Lumber

In connection with a study of the wood-using industries of various states, the United States Department of Agriculture is learning what part of the rough lumber output of our American sawmills passes through a second process of manufacture before it is ready for the consumer. The study is regarded as having an important bearing on the extent to which more economical use of our forest resources can be brought about. So far, the results obtained show that more than five-eighths of the rough lumber sawed is to be counted as the raw material for other industries which convert it into a more highly finished and more valuable product.

In the United States waste in the woods, the mill, and the factory is so great that two-thirds of what was in the tree is lost on the way to the consumer. The heaviest part of this loss takes place in the sawmills. Much of this mill waste is unavoidable under present conditions, but the greater the demand for the product and the higher its value, the better will economy pay. Waste in manufacture is very small, compared with that at the sawmill. Study of the demands of the wood-using industries may be a means of finding out how the mill may profitably market a part of what now goes to the burner in sawdust, slabs, and trimmings.

Statistics of the wood-using industries of Massachusetts, Maryland, North Carolina, and Wisconsin, lately gathered by the Department of Agriculture in cooperation with these states, show that of their total sawmill output thirty-six per cent is used in the form of rough lumber and sixty-four per cent is manufactured into other forms of output. If the same ratio holds for the entire country as for these states, about 13,000,000,000 feet of lumber is used yearly in rough form and 23,500,000,000 feet is further manufactured.

This is the first time that detailed figures have been obtained on this subject. The study which has yielded these figures has also in view to ascertain what commodities are made wholly or partly of wood, the various kinds of wood used, their origin, and

their cost, as well as other data of value to the growers of timber and to the sellers and buyers of lumber.

In making up the figures, lumber used as bridge timbers, house frames, farm fences, trestles, boardwalks, walls, and similar classes of structures, with only such cutting and fitting as is given it by carpenters, was classed as rough lumber; that made into flooring, finish, siding, sash, doors, frames, panels, stairs, boats, vehicles, boxes, baskets, turnery, wooden-ware, cooperage, musical instruments, farm implements, furniture, spools, handles, and like forms, was placed in the class of finished lumber.

The present aggregate population of the four states is estimated by their respective state officials to be 9,165,975; the population of the United States in round figures is 90,000,000, according to recent estimates. The average lumber cut in the four states for 1907 and 1908—the one an active, the other a dull year—was 3,753,293,000 feet, and for the United States it was 36,740,261,000. Calculated on this basis, the per capita use of sawn lumber in the four states was 410 feet and in the United States 408 feet. The per capita use in the four states of lumber further manufactured was 263 feet. These figures indicate a lavish use of lumber in the United States, for our per capita consumption is from three to ten times that of the leading nations of Europe.



The Forest Service In Nebraska

Referring to recent heavy fire damage in the national forest near Dunning, Nebr., on the Loup and Dismal rivers, the *Lincoln State Journal* quotes D. C. Deaver, a Nebraskan, as saying:

"Fire can never destroy the good work done by the Forest Service along the Dismal and Loup rivers in Nebraska. The fact that pine trees can be grown in the sand hills of northwestern Nebraska is so firmly planted in the minds of the farmers of that section of the state that even though every tree on the forest reserve should be destroyed by fire, the farmers will go on planting trees from year to year until that part of the state will look like a wooded country. In the early days of Nebraska, people were just as skeptical about growing trees in central and eastern Nebraska as they are now in northwestern Nebraska, if not more so. The growing of trees and the cultivation of the soil changes the nature of the soil, causing it to retain more of the moisture that falls and each ten-year period advances the line of the movement of farmers westward.

The time will come yet when the sons of the men now settling in the west will go back east to redeem the worn-out eastern farms."



Range Fires and the Texas Tick

Contrary to a widespread belief, the United States Department of Agriculture does not consider the burning over of national forest lands as an effective means of dealing with the cattle tick and the dreaded fever which it spreads. This is set forth by Secretary Wilson in the following passages of a recent letter to Representative Floyd, of the Third Arkansas district:

"I have just received a communication from Dr. Cooper Curtice, veterinary inspector of the Bureau of Animal Industry of this department, setting forth certain opinions respecting the burning of forests and ranges to destroy ticks which infest cattle and transmit disease, in which the department fully concurs. Doctor Curtice has had many years' experience with the department, is one of the original investigators of the fever tick, and has probably had more experience in this line of work than any other scientist. He has recently made a tour through northern Arkansas and investigated the conditions which exist in that locality, and his observations are therefore quite pertinent to the question of conflict in the policies of the the Bureau of Animal Industry and the Forest Service. The observations of Doctor Curtice are, in effect, as follows:

"It is true that at certain times of the year burning the grass on an enclosed field may remove the ticks wherever the fire travels, but even then many places remain unburned and the owner depends on the fire for eradication and consequently fails. At meetings of cattle men and others I have been speaking against the practice of burning over the forest ground and have held that no work would be saved in the process of eradication because the cattle should necessarily be treated according to some one of the methods specified in Farmers' Bulletin No. 378 (Methods of Exterminating the Texas Fever Tick), in order to secure perfect results. It is necessary to remember in this connection that there are many unburned places, especially around the dwellings, barns and other places where cattle lie.

"Wherever the grass is repeatedly burned the roots become eventually destroyed, the sweeter grasses give way to the more resistant and finally the latter perish. Not only does fire destroy the scanty sod, but in removing the leaves as a protective covering the hot sun of summer is permitted to dry the soil to a crust and continues the devastation. The best grass I saw was in a place where the young growth was at least three years old. In so far as tick eradication is con-

cerned, it seems to me an injustice that the necessities of the work should be quoted as being opposed to the needs of the Forest Service. Firing the leaves has not eradicated the ticks, although followed for years. Instead of being beneficial in the forest, it has killed out the grasses and even the new growth of trees, which so often furnish in spring the only source of nourishment—the buds upon which the cattle may browse while the scanty herbage grows.

"I have steadily advised that pastures, meadows, and growing crops be provided, upon which the cattle could be held and fed the year around, and thus the need for using the range be obviated, and the farmer, by securing control of the feeding and breeding factors, be able to raise better cattle for the markets. Under present conditions the mountain farmers are saving no manure, are making small crops, and are raising a very poor quality of cattle and hogs. By attending to better cultivation, diversified crops, and feeding stock on the farm, and abandoning the prejudicial burning of the woods and range, they can raise a very high quality of live stock and acquire a better money crop than they have heretofore held.

"From my observations and conversations with the farmers of the Ozark Forest, on my recent trip, I am led to believe that they will take up tick eradication as soon as they can raise the necessary money. The legislature meets in 1911 and they will then ask for a new five-cent district in addition to state funds."



Changes In Two National Forests

The President has signed proclamations adding 129,819 acres to the Pecos National Forest, New Mexico, and removing 31,561 acres from it; and adding 18,115 acres to the Garces National Forest, Arizona, and removing 53,500 acres from it.

In the case of the Pecos forest, the additions lie entirely south of the former boundaries of the Pecos, and embrace the top of the Glorieta Mesa south to within a few miles of Canyon Blanco, and also include two tracts near Las Colonias. The line has been so drawn as to exclude the entire Pecos Valley and confine the forest to the best timbered areas in this region. In the case of the addition south and west of the Pecos River the boundaries follow the rim of the Mesa as closely as possible.

Some yellow pine timber, estimated at 43,000,000 board measure, is found on the Glorieta Mesa, but a great deal of the former stand has been cut off. Under care-

ful management, it is hoped that both the quantity and the quality of the pine can be markedly improved. In addition to the yellow pine, there is a large quantity of cordwood and cedar posts which are readily accessible to the various shipping points along the Santa Fe Railroad.

No grazing fees will be charged upon this addition for the first year, and the grazing rights of all those who have been in the habit of regularly using this area will be very carefully protected. All the valid claims initiated prior to the temporary withdrawal of this land will be allowed to proceed to patent precisely as if the forest had not been created, and any lands found to be chiefly valuable for agriculture and not needed for administrative purposes will be listed to settlers under the act of June 11, 1906.

The eliminations made by this proclamation lie along the west side of the forest, and embrace a strip from two to three miles in width from the northwest corner south to the Juan de Gabaldon Grant. While these lands contain some juniper and pinon timber, there is not enough of it to warrant keeping the area within the forest. No portion of the watershed of the Santa Fe Creek is affected by this change.

The additions and eliminations in the Garces forest are located at various points along the exterior boundaries of all three divisions. The additions consist generally of rocky foothills and high mesas cut by deep draws, with gravel and sandy clay formations. The eliminations embrace low, rolling hills sloping toward the plains and at various places precipitous barren rock.

The forest growth on the additions is oak, mesquite, desert willow, ash, and walnut, averaging from five to eight cords to the acre, while on the eliminations there is less than two cords of scattered and stunted black and white oak and mesquite to the acre. No irrigated or irrigable lands depend for water on the areas eliminated. These are either rocky or consist of gentle slopes with shallow soils and only a scattered covering, without present evidences of erosion.

During a portion of the year grazing conditions are fairly good in all of the added areas, but it is hoped that the carrying capacity of the range can be greatly increased by construction of tanks at suitable points.

The lands eliminated by this proclamation will be restored to settlement and entry after being previously advertised by the Secretary of the Interior.

Hereafter the Garces National Forest will be administered by Supervisor R. J. Selkirk, at Tucson, and all communications involving matters on this forest should be addressed to him.



STATE WORK

Forest Fires In California

A strenuous campaign against the prevalence of forest fires, says the *Sacramento Union*, is being mapped out by State Forester G. W. Homans and Chief Deputy Hodge with a view to introducing systematic work on the part of private owners and lumber companies against the great destruction which has marked the last few years.

In all probability, Homans will present a proposition to the next legislature for the establishment of a system of forest patrol paid by the state and to cooperate with the federal forest rangers. Forester Homans believes this to be the most practicable method of meeting the fire question and is enthusiastic for its adoption in the state.

The forestry department will attempt to induce the various counties of the state to make appropriations for county firewardens, and appeals have been made to lumber companies and private timber land owners to make recommendations for the appointment of deputy firewardens.

Lists of firewardens throughout the state will be tabulated for the purpose of securing complete data without unnecessary delay on all forest fires. Printed rules referring to the making of fires will also be distributed freely, and many precautions will be taken against fire.

Last year's reports show a total of 638 forest fires, 245 being of unknown origin. Campers are held responsible for the setting of 114; lightning, seventy-four; engines, fifty-three; clearing land, forty-five; incendiary, thirty-nine; hunters, twenty-one; blasting, nine; smoking bees, seven; and electric wires, two.

The total acreage burned last year was 357,269, and 40,000,000 feet of timber, valued at \$100,000, was destroyed. The largest number of fires reported in any single month was in August, when 174 fires were reported.



Railway Ties In Connecticut

From the Connecticut Agricultural Experiment Station comes the statement that serious inroads on Connecticut forests are being made by the railroads in their search for ties. An officer of the station says that in certain cases owners of steam sawmills used the chestnut tree blight to induce owners of chestnut woodlands to sell their trees.

The New Haven railway system is consuming about 2,000,000 ties a year, the price for which has for some time remained stationary and during the last five years has increased only 10 cents a tie, the price of first-class ties being now 50 cents each, and of second class, 30 cents each, whether the ties are sawed or hewed. On its electric zone, however, the company uses exclusively creosoted ties, which last for twenty years, while non-creosoted ties last about seven years. The cost of the creosoted ties is about twice that of the ordinary ties. As a matter of relative economy, therefore, it seems probable that the use of creosoted ties by the company will be considerably increased.



New Hampshire

The New Hampshire Forestry Commission held a meeting March 30 at Gorham in the interest of forestry and especially of protection from forest fires. Besides the commissioners, several foresters and representatives of the large lumber companies of the state were present.

W. T. Cox, of Washington, assistant forester, United States Forest Service, outlined the methods of cooperative fire protection practiced by the large timber interests in the northwest.

Austin Cary, superintendent of state forests of New York, formerly forester for the Berlin Mills Company, and later professor of forestry at Harvard, sent a paper on the methods of dealing with the forest fire problem in the Adirondacks, which was read by Philip W. Ayres, who supplemented the paper with statements concerning things that have been noted in his own work.

Forest Commissioner E. E. Ring, of Maine, and State Forester A. F. Hawes, of Vermont, gave addresses on the work in their states, and E. C. Hirst, state forester of New Hampshire, outlined the New Hampshire situation.

A committee was named from the lumber interests of Coos, Carroll, and Grafton counties to consider methods among themselves for protection against destructive forest fires. A. B. Libby, of Gorham; W. R. Brown, of Berlin, and M. F. Blanchard, of Portland, are members of this committee.

New York

Robert W. Higbie, a New York lumber merchant, urges the need of purchase by the state of 1,000,000 acres of Adirondack lands. Of the four and a half million acres in the region, one a half are now owned by the state; 1,000,000 are virgin timber and their purchase is out of the question; a half-million are privately owned; and a half-million are occupied by the villages. The remaining million Mr. Higbie would have the state purchase. "They are at present being denuded, and practically no effort is being made to replant trees thereupon. In the hands of private individuals it cannot be expected that any scientific effort will be made to replant the trees which have been cut down. Returns cannot be secured from such replanting for from fifty to seventy-five years, and the average investor cannot afford to wait that length of time. The capital outlay also is too great for most private enterprises. And then the fire risk attached to the possession of forests is such that the average company does not desire to assume it. As a consequence the lumber supply is diminishing, and a lumber famine, in the absence of such a policy of conservation as is proposed, will be inevitable. There will also be a lack of such regulation to the water supply as can be secured only by a good forest growth.

"None of these objections to entering the forestry business, which apply to private enterprise, are applicable to the state. The state can afford to wait for a return, and an investment made by it in forest lands will yield a rich return in the future. It can afford to assume the fire risk. With the splendid fire law which we at present have, this risk would be comparatively small. The state would not need to insure forests any more than it does its public buildings. In possession of large quantities of land, it would not be ruined should there occur a fire in one portion of the forest lands, as would a private enterprise with the land concentrated in one or two places."



Oregon Forests First

Oregon forests have incalculably greater wealth as a state resource visible than any other industry here. Stumpage valuation of the standing timber in the state runs into the hundreds of millions of dollars, whereas the market value of this timber, when manufactured, the figure that must be brought into the state to get the timber, on the current prices of lumber, ranges from \$5,000,000,000 to \$7,000,000,000. Yet no important laws have been passed with special reference to the fostering of this industry, its protection, encouragement, or recognition in any form whatever, save that a state board of forestry has been created.

For the protection of fish interests, from which only a small sum is realized annually, state laws have been passed and officers named to study needs and guard against ills. Inspectors are authorized to keep fruit orchards and their product in clean, marketable condition, because it is found that disease, when started in a neglected orchard, spreads to harm the careful worker. State veterinarians inspect live stock and spend much time protecting this industry. A large appropriation is made for agricultural education and the advancement of farm life.

Against all of this interest on the part of the state for various sources of wealth, the timber owner and lumber manufacturer finds himself receiving no consideration whatever. One negligent owner of forty acres of forest land might start a conflagration that would destroy in a week \$100,000,000 of timber, or even more. Thousands of acres of burned and cut-over forest land in the state are idle, losing every year to future generations several million dollars. In the regulation of log driving on creeks and larger streams, the cutting in forest and mill, and all other problems that affect the present and future of Oregon's peerless timber wealth are untouched by state statute, and no fostering effort is made in behalf of the great Douglas fir.

Members of the conservation forces believe that the state has within its own hands the power to accomplish great things. About four-fifths of the standing timber in the state is on private holdings, and with this the state will have to deal, as the national government treats only with the national reserves. Grasping this possibility, and realizing what timber means to the state, the two conservation organizations will give forestry and the lumber industry first consideration for the next year or two. All other conservation will not be put aside, but forestry will have first place, until a code of laws has been framed which promises the greatest possible returns to the people of the state, and perpetuation of the forests on land that is not more valuable for other purposes. As the work progresses, the recommendations contemplated will be given out for discussion, to insure the broadest publicity, so that by the time the next legislature is in session, whatever is put before the lawmakers will be known to the people.—*Portland Telegram*.



Pennsylvania Convention of State Foresters

The foresters of Pennsylvania's state board held their third annual convention at Harrisburg on the 1st of March. In his opening address, Governor Stewart said that "from one end of this country to another the vital question which is uppermost in the minds of both the officials and the people is the question of the preservation of our for-

ests." In referring to Pennsylvania's advanced position, he paid a tribute to the work of Dr. J. T. Rothrock and Miss Mira L. Dock.

Pennsylvania has 916,569 acres of state forests, and trains its own forest force at its academy at Mont Alto under Chief Forester George H. Wirt. Thirty graduates of the school were present at the convention and discussed with intelligence and understanding problems of their work. What the Pennsylvania foresters are looking forward to is the putting once more under forest cover of the 9,000,000 acres of land in the state that are unfitted for agriculture. It is a splendid object and a great task, and one that means much for the future of the state. The forest problem is studied more completely in Pennsylvania, and is being worked out more along the lines of German scientific forestry than in any other commonwealth of the United States. At this meeting the whole forest problem, as it affects state, nation, and the individual was considered, and in a most admirable spirit. The following declaration of principles of the Pennsylvania Department of Forestry was adopted:

"The Pennsylvania Department of Forestry in every part of its organization, being mindful of the interests of the farmer, the lumberman, the manufacturer, the dwellers in cities, the continued health and prosperity of a long-lived commonwealth, has since its organization followed and will continue to follow the policy herein outlined as the one best fitted to produce desired results and invites the cooperation of all the interests affected as a prerequisite for a successful system of forest conservation.

"1. That since private woodlot owners hold more forest land than the state, they should be aided in its care and development by the distribution of seedling forest trees at cost, by personal assistance when desired, and by information relating to the best and most economical methods of forest preservation and restoration.

"2. That complete publicity concerning the work of the department is desirable in the interest of both the state and its citizens, and forest officials should utilize every opportunity to reach the public through the press, through public meetings, or other suitable means.

"3. That since the present system of taxation drives the timber owner to cut his forest that he may avoid what amounts to confiscation by excessive taxation, the only wise system of forest taxation in this state is to tax the land annually and the timber crop only when the latter is cut for the market.

"4. That at least 20,000,000 of young forest trees should be planted annually on state lands alone, and that private woodlot owners should be encouraged and aided in planting as many more as possible.

"5. That no forester should be expected to develop and care for more than 10,000 acres and do it well.

"6. That foresters should be so located on reserves as to bring several into the same neighborhood, that their isolation may be broken, their safety assured, their families educated, and that better protection may be afforded the forests because of their mutual assistance.

"7. That a system of telephone communication, especially for use in pressing emergencies, should exist between important forestry points; that a system of good roads be established and maintained on the reserves to connect with other important public roads, and to reduce to a minimum the expense of removing and marketing the product.

"8. That a system of lookout stations, as recommended and discussed in the report of the Department of Forestry for the years 1903-4, connected by a telephone and equipped with complete signal, map and range-finding outfits, should be erected at commanding points to detect and locate fires; that during fire seasons a sufficient force of laborers should be employed, immediately available for the prevention and suppression of fires, and when not so engaged, in doing other necessary and valuable work, on the theory that it is cheaper to prevent than to suppress a fire, and that, in addition, the timber is saved.

"9. That because of its location on one of the most important reserves where students learn forestry practice by actual labor and the principles of forest science by classroom instruction, the State Forest Academy at Mont Alto should be continually developed as a school of forestry and brought to the highest possible point of efficiency.

"10. That since American forestry is in its infancy, extensive experimental work by plots for seeding and planting, by pure and mixed forests for rate of growth, and result of different methods of management of natural stands of timber should be carried on within each reserve and accurate data collected and preserved for future use; that since the public is the owner of these lands, they should be encouraged to enjoy them to the fullest extent that may be done without interfering with the purpose for which they were purchased.

"11. That these policies, some of which now are and others of which ought immediately to be carried into practical operation, would mean a production of timber for the farmer's fences, fuel for his fire, and lumber for his buildings; for the lumberman, perpetuation of his industry; for the manufacturer, a steady supply of raw material for his plants; for the dweller in cities, outing grounds and a permanent supply of pure water; for the tired, underpaid citizen who needs simply rest and recreation to prevent his becoming an actual invalid, a place where he may find health and renewal of life; and for the commonwealth and for all her citizens, the restoration of an industry which once was worth thirty millions of dollars

annually as the lumber fell from the saw, and for which there can be no substitute, and also to curb the rapidly advancing prices of the necessary products of the forest. To

accomplish these results, desirable, legitimate, and born of economic necessity, it is incumbent upon the legislature to provide the means."

EDUCATION

Biltmore Forest School

The first visit of the Biltmore Forest School to the German forests for study and work is completed, and with very satisfactory results. The students were able there to study conditions which do not yet exist in the United States, but are likely to in some of our older states in the near future. Our American boys were somewhat surprised to find an opportunity to study American tree species, especially conifers. In the Odenwald the students had an opportunity to see how poor private forests are even in Germany.

At Karlsruhe, in the Black Forest, there was seen a fine hardwood forest containing many species, notably ash, which yielded over \$8 per acre, net, annually. The school arrived in New York on the 18th and will visit the tree nurseries of New York state. This visit is the result of negotiations between Doctor Schenck and Commissioner Whipple for the mutual benefit of the school and the state. The commissioner believes that in bringing the students who have studied German conditions at first hand into close relationship with the tree nurseries of the state, technical advantages in German methods will be brought out and the general forestry work of the state thereby benefited.

From New York the school goes to Biltmore early in May.



Correspondence Course in Forestry

The School of Agriculture of the State College of Agriculture and Mechanic Arts at Brookings, S. Dak., has instituted correspondence courses for home study in various branches of agricultural science. Four systematic courses are offered in horticulture, covering the subjects of vegetable gardening, fruit culture, floriculture, and forestry. The courses are planned not for financial profit, but to bring scientific and practical instruction within the reach of those who cannot at-

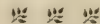
tend college, yet are ambitious to gain instruction which will be helpful in their work and life. Information in regard to these courses can be obtained from Prof. A. A. Brigham, director of college extension, Brookings, S. Dak.

Correspondence courses are undoubtedly helpful if their limitations are fully recognized. The trouble is that they have been so largely exploited for commercial purposes by some of the great correspondence schools that too much has been promised and expected from them. Such an enterprise as the South Dakota school has on foot may be very helpful to its constituency.



A National School of Forestry

A bill has been introduced by Senator Burkett of Nebraska in the United States Senate to establish a national school of forestry at Nebraska City, Nebr., as a memorial to the late J. Sterling Morton, formerly Secretary of the Interior, and founder of Arbor Day. The bill makes an appropriation of \$250,000. It is said to have the approval of the Secretary of Agriculture and of the Chief of the Forest Service.



Forestry in the State College of Washington

A four years' course in forestry has been added to the program of the State College of Washington at Pullman. The two years' course, formerly given, has been reduced to one year and is now designed to prepare men for positions as forest rangers. The four-year course is intended to fit students for the higher branches of the work. The course is said to be strong along the lines of botany and engineering in connection with forestry. Last year there were thirty students enrolled in the two years' course. The outlook is good for a large enrollment next year.

NEWS AND NOTES

TAXATION OF FOREST LANDS

Pertinent Comments by Henry James, Jr., and
Hermann von Schrenk

In a letter to the *Springfield Republican*, Henry James, Jr., chairman of the committee on legislation of the Massachusetts State Forestry Association, makes this admirably clear statement of the position of the association on the question of forest taxation, and of its relation to the present movement to so amend the constitution of that state as to permit the classification of property by the legislature for purposes of taxation:

"The present law, which taxes woodlands on their full market value each year, is tolerable only because it is not enforced by the assessors. This is conceded, and one illustration will serve to make it quite clear. Imagine a bond, the conditions of which were that no coupons could be cut until the fortieth year! A growing forest is comparable to such a bond. If the bond were to be taxed annually on the full capital value of its accumulating but unavailable coupons, nobody would own it. In an exactly similar way no one would hold woodland if taxed annually on the full value of the uncut and immature crop. Forest land is very generally assessed at less than half, and as little as a quarter of its value. The law is thus made bearable.

"But it is idle to pretend that a law which appears so bad on paper is not an evil in fact simply because it is not generally enforced. It may be enforced, and sometimes is. I know of a case in which the board of selectmen recently increased the valuation on a large tract of woodland 300 per cent in one year. A law under which valuations, and therefore taxes (a chief expense in forest management, be it remembered, though not the only risk), are unpredictable within 300 to 400 per cent is a real discouragement to enterprise and to long-sighted and progressive forest management. If it is possible and desirable for the state to increase its forest resources such legal discouragements should be removed immediately. The forestry association believes that the state can now expect greatly increased returns from its nearly 3,000,000 acres of forest and waste land. The forest products which we have drawn from other states have lately been reaching starvation prices. We have ourselves a climate and soil admirably adapted to the growth of several of the best forest trees and the Massachusetts market

offers advantages unsurpassed in America for both large and small operators.

"To point to one industry only: The consumption of box and package material in this manufacturing community is constant and amounted in 1908 to more than \$5,500,000 worth in wood, yet only about two-fifths of this was supplied by the woodlots of the state. The opposition has argued that although the forest products of the state might be greatly increased, danger from forest fires and other risks stand in the way as much as do taxes, and that these other difficulties should be removed first.

"This, however, is plainly a desperate argument. We should do away with each difficulty as soon as we can and not stand upon the order of their going. Finally, although the association cannot say that constitutional relief is clearly impossible, it has, during the last five years, given a good deal of attention to this subject without being able to hear of or devise any satisfactory law which appears to be within the requirements of the present constitution. In advocating a radical reform in the taxation of forest land the forestry association does not, however, go beyond its own field. The proposed amendment to the constitution is broad and other tax reforms and legal questions are under discussion. In justice to some of its members and to the public, the forestry association wishes it understood that with these other questions it has no concern."

THE MOST VITAL PROBLEM

Dr. Hermann von Schrenk in the course of an address to the Louisiana conservation congress, said: "The most vital as well as most pressing problem is that of taxation of timber lands. We cannot discuss this enough. As now practiced, the method of taxing lands with standing timber puts a premium on cutting all the timber as quickly as possible. * * * The first thing to be worked out, then, is to find some method whereby the taxes levied on forest lands and cut-over lands are so regulated that it may become a profitable matter to grow trees either by natural seeding, or, if necessary, by replanting. It has been suggested that we recommend the adoption of some plan like that in force at the present time in Canada, where growing timber, left on the land for the avowed purpose of yielding a future crop, is charged only a nominal general rent until ready for cutting, and when actually cut, such timber is taxed on the basis of the actual value of the logs put through the mill.

That would offer an incentive for every owner of lands fitted for forest growth, to protect his young timber against fire and to do everything possible to encourage the growth of trees, these to be utilized by the coming generation. Others have suggested that the state require the owner of cut-over lands to replant trees, paying for the work by increasing the valuation of both timbered and cut-over lands and using the taxes so collected for doing the work. Others again have proposed that the state take care of all cut-over lands and plant them. I am not disposed to advocate any particular plan to-day, realizing as I do the great diversity of interests which will be affected by any plan which may be proposed. I wish to emphasize the importance of this question, however, and point out that in this as in all other matters of great moment, the voluntary action of a man, or group of men, who have a personal interest in any lands will be worth more than any enforced rule or regulation which the state may promulgate. If you or I find that we can plant trees or grow trees with profit, we will only have to be *shown*, and no one will have to drive us (that's what we do in Missouri). A compulsory action will only too frequently be followed by giving up the whole matter, and in the end defeat the very object striven for. I can see no more vital problem for the conservation commission to take hold of than this question of timber land taxation. We should study it in all its stages and above all we should work out some plan which will hold in all the states. The various commissions could get together and act in absolute harmony. What is proper in one state is bound to apply in all the others. Let us not forget that the principle of self-interest, the show-me spirit, which controls most of our business operations, will work with timber lands in the same manner.

If no taxes can be devised whereby the individual can be induced to engage in practical forestry, there is the other alternative of state or government control of cut-over lands. The state or federal government might purchase millions of acres of cut-over lands at very low figures, and on such reservation timber culture could then be carried on, also. Some states have already established state reserves and others are working out some such plans. This point is one for each state commission to consider in connection with the tax question."

A Correction

In Professor Swain's article, published in our April issue, on page 230, there was an error in the use of quotation marks. Referring to a point made by Professor Moore, Professor Swain's paper was made to say "He says 'the floods have not increased. I

do not know definitely about forests, therefore the forests have no effect on floods.'" This should have read without any quotation marks: He says in effect, etc. Professor Swain was giving in his own words the substance of the argument of Mr. Moore as he understood it.

Bejuco (Rattan)

Very few people realize the importance of the minor forest-products industry of the Philippines. This industry is the collecting and selling of firewood, gums, resins, rattans, and all other forest products except lumber. Of these products, rattan or bejuco, as it is commonly called in the Philippines, is by no means the least important.

In the year 1905-6, forest charges were paid on over 45,000,000 pieces, and in the following year the output reached over 50,000,000 pieces, each about four meters long.

The best bejucos are obtained from the mountains, and are usually collected by mountain people. Those that come from the lowlands are usually inferior in strength and fineness of fiber.

Rattan has a wide range of uses. The largest and strongest pieces of the choicest kinds are made into furniture and ornaments of various kinds. When split into strips, bejucos are woven into chair and bed bottoms, and for use around bottles. In some places they are used for flooring, as a substitute for bamboo. By far the largest local use to which bejuco is put is for tying purposes. Bejucos are cheap, strong, and abundant, and therefore preferable to hemp for packages, when exposed to weather. They are universally used in the Philippines as a substitute for nails. The parts of many houses are entirely bound together by means of bejucos. Especially large pieces are stretched across streams, as cables for ferries.

Bejucos are well known to manufacturers all over the world, and are in great demand. At present, they are abundant in the more remote provinces of the Philippines, but if they are wasted or the reproduction is not considered, they will be as scarce as they are at present in many thickly populated provinces. Therefore, the Bureau of Forestry is using care in granting licenses to cut bejucos and is trying to bring the industry under more conservative management.

The National Grange on Conservation

The platform of the National Grange, Patrons of Husbandry, recently issued by the legislative committee, contains the following paragraph on "Conservation of Timber and Mineral Lands":

"The conservation of timber and mineral lands, and the control of all water power now owned by the government, the building of reservoirs to conserve the waters of our country for transportation, power, and for irrigation purposes; and reforestation of lands unsuitable for agricultural purposes, the farmers feel is in the interest of the entire people, and urgently demand in the future interest of agriculture should receive the favorable and speedy consideration of Congress by the enactment of effective laws that should be rigidly enforced."



Up and Be Doing

In the matter of the proposed Appalachian-White Mountain forest reserve, three conclusions seem to be established:

That there is strong popular demand in the east that the forest areas indicated shall be set aside as a national forest.

That there is a substantial majority in both houses of Congress for this legislation, and that action is being delayed mainly through the failure of the House Committee on Agriculture to report on it.

That recent papers on forests and stream-flow issued from the Weather Bureau and the Bureau of Forestry show a sharp difference of scientific opinion between the two bureaus of the department of Agriculture in a matter which involves the welfare of the nation.

With the experience of China as a guide, Professor Moore's opinion that forests have nothing to do with floods is interesting, but not much more. That it should suffice to withhold from the people a thing of prime importance to the entire Atlantic seaboard is preposterous. Let the Agricultural Department reconcile the academic differences between its branches when it pleases. But as to the protection of the east from flood and dry stream-beds—

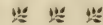
The day is short, the work great, the workmen lazy, the wages high, the master urgeth; up, then, and be doing!—*Baltimore News*.



The Real Fight at Hand

Now that the Appalachian national forest reserve bill has been favorably reported by the house committee, the real fight for its passage is at hand. It is undoubtedly true, as the majority report of the committee says, that there is no more important measure before Congress, and that the almost unanimous sentiment of progressive citizens demands favorable action; yet there is an ostensible divergence of congressional opinion, which, in reality, is based to a considerable extent on selfish individual interests rather than on a sincere desire to prevent the proposed expenditure—"investment" would

be a more appropriate words—of public money. It may be argued, with truth, that the opposition to this bill constitutes rank ingratitude, coming as it does from quarters which have benefited tremendously by the bounty of the federal treasury, through the enthusiastic help of New England and the Southern Appalachian states. That goes without saying; but if those quarters are disinclined to do the square thing and recognize the proverbial deserts of "one good turn"—or, as in this case, many good turns—the only remaining course for the champions of the bill to pursue is that of compelling its passage in spite of the selfish opposition. This course will be pursued, and it is bound to succeed—perhaps at the present session of Congress, but if not, at a session not far in the future. Sentiment favorable to the Appalachian national forest reserve project is increasing by leaps and bounds, and even now has all but reached a stage where serious opposition would be futile, if not absurd. Whether or not it has quite reached that stage will soon be determined.—*Manchester Union*.



The Growth of a White Pine

The state forester of Vermont recently received from Middlesex, in that state, a cross-section of a white pine thirty-two inches in diameter and seventy-seven years old, as shown by its rings. From the tree were cut seven twelve-foot logs, measuring 1,495 feet.

An analysis of the growth of this pine throws light on the growth of trees in general. Its diameter inside the bark at various ages was as follows: Ten years, three and one-half inches; twenty years, nine and one-half inches; thirty years, fourteen and one-fourth inches; forty years, eighteen and three-fourths inches; fifty years, twenty-two and three-fourths inches; sixty years, twenty-six and one-fourth inches. This shows that the greatest diameter growth was made during the second decade. In fact, during the first twenty years of the tree's life the rings averaged nearly one-half inch in width. As a matter of fact, however, the production of lumber in a tree is not proportional to the diameter growth, but the growth of the whole cross-section, or the square of the diameter. Now, the cross-section of the base of this tree at various ages was as follows: Ten years, seven-one-hundredths of a square foot; twenty years, one-half of a square foot; thirty years, one and one-tenth square feet; forty years, one and nine-tenths square feet; fifty years, two and eight-tenths square feet; sixty years, three and three-fourths square feet; seventy years, four and sixth-tenths square feet; seventy-seven years, five and one-fourth square feet. In other words, the growth of the cross-section in the second decade was four-tenths of a square foot; in the third

decade, six-tenths of a square foot; in the fourth decade, eight-tenths; fifth, nine-tenths; sixth, ninety-five-one-hundredths; seventh, eighty-five-one-hundredths, and in the last seven years, sixty-five-one-hundredths. The rate of the growth of the tree culminated, therefore, between the ages of fifty and sixty years, while a superficial examination of the rings would lead one to think that it reached its maximum growth by the age of twenty.

It must also be remembered that in addition to the growth there is a constantly increasing quality increment. Not only do the lower limbs drop off in the early life of a tree grown in the forest, thus making the older lumber clearer; but boards two feet wide are no longer common and are worth more per thousand feet than boards a foot wide. The growth of this particular tree is no doubt largely due to the fact that it happened to have the best amount of light and moisture during the first half-century of its growth. It is probable that had the forest been properly thinned at that time the same growth might have been maintained during the next quarter-century.



Western Forest and Conservation Association

Government and state forest officials, timber owners, and conservationists in Montana, Idaho, Washington, Oregon, and California perfected plans for uniting these agencies in a cooperative scheme for systematic forest protection in the western states at the semi-annual meeting of the Western Forest and Conservation Association, which closed its two days' session at headquarters in Spokane the afternoon of April 5.

Albert L. Flewelling, of Spokane, was re-elected president, the other officers being as follows: Vice-presidents, G. W. Millett, Kalispell, Mont.; F. J. Davis, Coeur d'Alene, Idaho; E. J. Ames, Seattle, Wash.; A. C. Dixon, Eugene, Oreg.; E. H. Cox, Madera, Cal.; trustees, J. R. Toole, Missoula, Mont.; T. J. Humbird, Sandpoint, Idaho; G. S. Long, Tacoma, Wash.; F. C. Knapp, Portland, Oreg., and J. H. Queal, McCloud, Cal.; secretary, George M. Cornwall, Portland; treasurer, A. W. Laird, Potlatch, Idaho.

Incorporated in the association are the Oregon Conservation, North Idaho Forestry, Washington Forest Fire, Washington Conservation, Potlatch Timber Protective, Clearwater Timber Protective, Pend Oreille Timber Protective, Coeur d'Alene Timber Protective, Northern Montana Forestry, and Oregon Forest Fire associations.

President Flewelling, in his opening address, emphasized the impracticability of so-called uniform legislation between states, on the subject of fire protection, saying in part:

"I think you should not lay too much stress on uniform legislation between states, as you all know that conditions differ so

greatly in different localities that a law for the disposal of brush and rubbish on cutover lands which would be practical and desirable in Montana would be impractical and undesirable in Oregon, and vice versa. The same is true of the planting and caring for the new growth on cutover lands. Conditions in Idaho are so different from those in western Washington that what is desirable in one place is undesirable in another."

E. T. Allen, forester for the association, outlined the work of permanent organization which had been under way the last four months. In dealing with the campaign of education being conducted by the association, he said, among other things:

"With the approval of the trustees, I have been working for some time on a handbook on forest management which will deal with the question from two sides. It is primarily an attempt to answer most of the questions occurring to the owner of timber land who is interested in reforestation. The elementary principles of forestry which are applicable to our conditions from Montana to California will be discussed from a scientific and practical standpoint. The rate of growth and possibilities of a second crop of the several species will be given from the best data available from the government and elsewhere, together with the methods necessary to secure reproduction. We believe that this publication will not only fill a real want, but receive considerable attention by government officials, forestry schools, and such authorities, as well as by the press, and thus show what we are doing to promote true forestry."

One of the principal matters discussed was the extension of cooperative patrol. It was brought out in the discussions that nowhere else in the United States are private timber land owners as progressive in forest fire prevention as on the Pacific coast. The forest fire associations of Washington and Idaho spent nearly \$100,000 for patrol in 1909. Owners in Oregon spent about \$40,000 without formally organizing, but this season it will do much more through the Oregon Forest-fire Association. Montana has also organized and California is following. These systems are being extended into districts left unprotected, and arrangements will be made for close cooperation between the association patrols and those maintained by the states and government. The movement that is being carried on by the Western Forestry and Conservation Association for systematic protection on all forest lands, regardless of ownership, is unique in the history of the United States and is being watched with much interest in all parts of the country. Plans were also considered for uniting the government, states, timber owners, and public conservation organizations in their educational propaganda along forestry lines, so that conflicting or impractical measures will not be advocated and that any proposed legislation can receive public confidence. To this end it was

voted to permit all affiliated associations equal voice in the affairs of the parent organization, regardless of their financial support, and to have the states and the national forest service represented by their chief forest officers in the territory embraced.

It was also voted to raise funds for collecting and disseminating reliable information regarding fire prevention, conservative logging methods, and reforestation. Forester Allen was authorized to prepare data for a handbook along these lines as one of the first steps.

Discussion of practical fire preventive methods, such as patrol systems, disposal of logging debris, and safeguarding logging and railroad engines, occupied much of the time of the association. Representatives of the Forest Service described a form of contract recently entered into by several prominent railroads traversing the national forests which provides for clearing the rights of way of inflammable materials, patrolling the track with speeders, and handling possible fires. It was brought out that the railroads' interest in maintaining a lumber traffic is manifested by increasing cooperation with all protective effort. The use of oil for fuel by loggers and railroads was advocated.

Federal and state officials in attendance included G. M. Homans, state forester, and W. C. Hodge, deputy forester, California; J. R. Welty, state firewarden of Washington, Olympia; C. S. Chapman, district forester, and G. H. Cecil, associate forester, Portland, and F. A. Silcox, associate district forester, Missoula. R. W. Douglas, Seattle, represented the Washington Conservation Association. Other affiliated organizations represented were the Oregon Conservation, North Idaho Forestry, North Montana Forestry, Washington Forest Fire, Oregon Forest Fire, Potlatch Timber Protective, Clearwater Timber Protective, Pend Oreille Timber Protective, and Coeur d'Alene Timber Protective associations.

Among the delegates from the foregoing and timber owners present were G. M. Cornwall, E. T. Allen, Portland; W. S. Ewart, D. P. Simons, Jr., J. L. Snapp, Seattle; G. S. Long, Tacoma; A. W. Laird, Potlatch; T. J. Humbird, Sandpoint; F. J. Davies, Coeur d'Alene; E. O. Hawksett, Spirit Lake, Idaho; W. C. Ufford, Milan, Wash.; William Condon, San Francisco; A. L. Flewelling, J. P. McGoldrick, E. F. Cartier Van Dissel, H. P. Svendsen, C. H. Fancher, C. M. Crego, H. C. Culver, and H. C. Crombie, Spokane.



One Owner's Planting

Dr. Frederick Brush, superintendent of the New York Post-graduate Medical School and Hospital, last month planted twenty-five acres of recent slashing at Great Bend, Pa., with red oak acorns at a total cost of less

than \$1 per acre, buying the nuts. The area is sprouting rapidly to soft woods—ash, basswood, maple, etc.—and weed stuff. Doctor Brush intends to plant pine later on other lands.

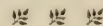


Burning a Half-million a Year

If any set of men deliberately burned up a million dollars—in the literal, not the colloquial sense—they would receive the reproaches of the Nation. If any set of men stood calmly and indifferently by while a half-million in crisp bank notes went up in smoke, they would be given the contempt of the world. Cries of prodigal waste and unreasoning extravagance would be heard on every side. Moralists would complain and economists would wring their hands in helpless anger.

But this is almost exactly what timber owners in Virginia have been doing for the last half-hundred years. Every autumn, by carelessness or neglect, they allow forest fires to begin. November winds fan the flames, and fallen leaves give them fuel. Before the winter is over, young timber, underbrush, fences, barns, and dwellings worth more than a half-million dollars go up in smoke. This year the annual waste has already begun.

This is waste, absolute and unwarranted. No more reason exists for it than for the neglect of fire protection in a crowded city. It is no more justifiable than would be the closing of our engine-houses and the disbandment of our fire departments. The same methods that minimize fire loss in the cities can be employed to reduce the havoc wrought by forest fires in the country.—*Richmond (Va.) Times-Dispatch*.



The San Antonio Basin

Mr. T. P. Lukens calls attention to the fact that he is misquoted by the French writer a translation of whose article we printed in March, his original figure of twenty-six miles in the basin of the San Antonio River being given at 267 miles.



A Neglected River

Speaking of the Mississippi River, the Beaumont, Tex., *Enterprise*, says:

"In the early days it bore on its surface the French and Spanish explorers; then came the trappers and traders, the Frenchmen of the North, and the merchants of the French colonies of the South, each utilizing it as a highway, and each pressing forward until

their lines of trade met near the mouth of the Ohio. Following came the flatboatmen, then the steamboats, and the Mississippi became a great highway of traffic. What would have been the result but for the railroads no one can tell; but the railroads came and the men who had been making use of the river in the past in the development of an

empire, tied up their boats and yielded the contest without a struggle.

The folly of this is now seen. Had the work of using the Mississippi been continued, had the labor of controlling the stream been systematically commenced back in the old days there would be a different history to write for the Middle West."

EXPLOITATION AND CONSERVATION

An Editorial in "The Survey"

Exploitation and conservation are master words of current public opinion. They are not new words, but it is a new thing to put them together, back to back. We seem to have arrived in the history of civilization at the point where two mighty currents of social and political policy are about to unite. Exploitation the world has always known. Ancient empires, as a matter of course, exploited their own resources and the resources of conquered nations and provinces, and they fell when there were no fresh resources to exploit. They wept, and had reason to weep, when there were no more worlds to conquer. Colonization in former generations meant exploitation, first of natives and then of colonists. Our own forefathers talked bravely about political representation, but their half-conscious, ultimate determination, being free-born Englishmen, was that they would not be exploited by their brethren across the seas. Colonial trade and taxation were exploitation scarcely veiled, while slavery and the slave trade represented that policy naked and unashamed. Throughout recorded history we find, now in one form and now in another, the using up of physical resources and of human energy in reckless disregard of individual and collective rights and interests. We find, also, that men revolted against the hardship and injustice of these exploiting policies, and we see evidences of more or less blind and bitter struggle between the exploiters and their victims. Exploitation and the ineffective struggle against it interpret more of human history than any other key which the historians have offered us.

The policy of conservation is of modern growth. It does not represent primarily the struggle of the exploited in their own defense. Conservation is not born of a desperate attempt to save a few remnants from the despoiler. It is doubtful if any exploited people could ever have worked it out. Rather it is a new economic policy, a new way of looking at all physical and human resources, a new basis for social relations, even for international relations. Its natural starting point is with a strong, free

and equal people, conscious of great unexploited resources and aroused to the great outlook of the future if those resources are husbanded and conserved, if they are utilized for the common good, and whenever possible increased as they are used. Conservation is a social, as exploitation is an anti-social policy. The striking thing, the inspiring thing, about our situation is that here in America, and especially in the free and resourceful atmosphere of the frontier communities, the fight against exploitation and the conscious adoption of a policy of conservation come at the same moment, come as two aspects of a single issue. These are the two great streams of history which here and now unite. This is the stirring moment in the history of civilization, when we see no longer a few weak slaves, or a conquered people struggling in vain against exploitation, but rather the intelligent and dominant citizenship arising as a giant in his wrath, let us say rather as a strong man in good-humored consciousness of his strength, to put an end to exploitation. And this democracy of ours is to put down exploitation not by fighting or punishing anybody—if that has to be done it is only an incident—but by changing the laws and the administration of the laws, by preventing the prosecution of exploiting policies, by instantly detecting exploiting acts and dealing with them appropriately.

Thus for us exploitation and conservation come to stand respectively for very definite things. They become sharply contrasting words, each meaning precisely what the other does not; and each requiring the other as a background to make its own meaning perfectly clear. Each embodies a whole series of conceptions, interests, public policies, legislative acts, and court decisions. We have naturally first applied the test of these words to physical resources. We have determined, not only in the interests of posterity, but in our own and our children's interests, to put an end to exploitation of forests, soils, mineral ores, and natural power, and to work out policies of conservation. This social control of natural physical resources we rightly deem to be essential to our dignity as a

state, to our physical and moral well-being, demanded by justice, dictated by sound public economy, and warranted by the political institutions, the constitutions and laws, under which we live. We suffer for the sins of omission of our fathers in this respect and for our own sins, but our neglect is not irreparable, and we have announced, as clearly as party platforms and statutes enacted or pending, and court decisions made or certain to be made, can announce anything, that we shall repair this neglect and lay broad the foundations for effective conservation in future years. Conservation and development, educational, financial, agricultural, and industrial, rather than exploitation and incidental destruction, are to be the watchwords of our new social democracy, and the political banners on which these watchwords are honestly inscribed are the banners under which the young men of the republic will enroll themselves.

We have applied these watchwords to physical resources, but it has not escaped attention that there is also a human side of the policy of conservation. Life is more than

meat and the body than raiment, and if our food supply and our lumber supply and our coal and iron supply must be conserved and developed instead of exploited, as they must, how much more must the bodies and the lives of our people no longer be exploited but conserved. The most important part of conservation, merely from the standpoint of dollars and cents, is the preservation and development of strong, healthy bodies, a decent, dignified status for workingmen, and a hopeful outlook into the uncertain but friendly future.

But we must not speak from the standpoint of dollars and cents—save as they symbolize real wealth, genuine welfare, substantial prosperity, of which the test is life and not property. A religious writer insists that the force of the religious spirit should be bent toward asserting the supremacy of life over property. "Property exists," he says truly, "to maintain and develop life. It is unchristian to regard human life as a mere instrument for the production of wealth." It is not merely unchristian; it is unjewish, unmohammedan, unintelligible, and unhuman.



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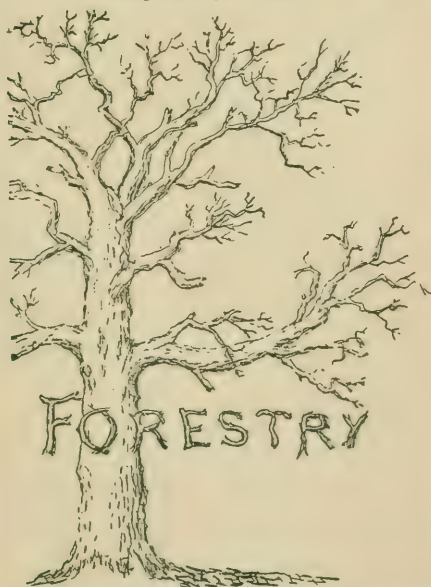
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American Forestry

The Magazine of the American Forestry Association

June

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Indexes for Vol. XV (1909) are ready and may be had on application

The American Forestry Association

is a national organization composed of public-spirited citizens who are interested in the prevention of the wholesale destruction of our forests, in forest extension and utilization, and in the fullest cooperation of national, state, municipal, and private agencies for these purposes. The Association has no business or governmental ties or alliances. Its work is to educate the people to know and understand the value and necessity of forests in the Nation's life and the way to maintain them to the best advantage through scientific forestry; and to bring about such wise legislation as will best secure the desired results. It is the people's forestry advocate and the representative of forestry before the people.

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LECTURE SERVICE.—It is proposed to establish a lecture service through which reliable lecturers upon forestry subjects may be obtained. This bureau will arrange with able lecturers at central points who will be available for lectures, with illustrations if desired, before clubs, associations, boards of trade, or general audiences.

CORRESPONDENCE BUREAU.—Through this bureau the Association will furnish information on forestry when possible and provide advocates of the cause with material.

LEGISLATION DEPARTMENT.—As it has always done, the Association will use the agencies at its command to secure the passage of wise legislation in furtherance of its great purpose. Its national character and the location of its main office in Washington enable it to keep in close touch with national legislation and it will cooperate, when practicable, with forestry workers in the several states to promote good state legislation. Its first and most important object in legislation is the passage of a measure for the creation of National Forests, with especial reference to the southern Appalachian and White mountains.

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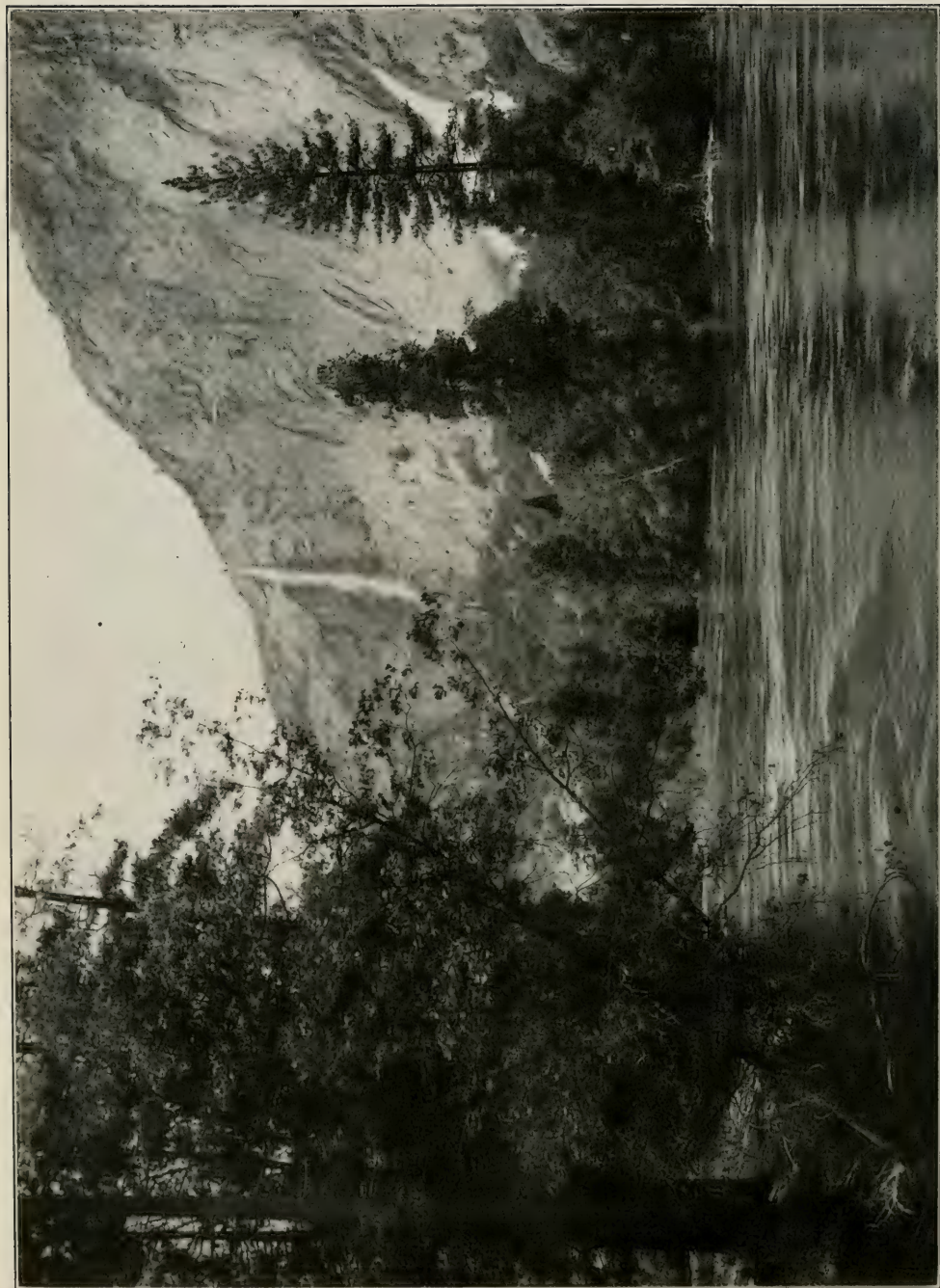
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Dear Sir: I hereby signify my desire to become a member of the American Forestry Association. One dollar (\$1.00) for annual dues is enclosed herewith.

Very truly yours,

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TUEULALA FALLS, HETCH-HETCHY VALLEY

View from across the river, Wapama Falls just showing at the right

Photo by Herbert W. Gleason

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Vol. XVI

JUNE, 1910

No. 6

A FORWARD STEP IN FOREST CONSERVATION

By WM. L. HALL

In Charge Branch of Products, Forest Service

AN ADVANCE in forest conservation is realized in the establishment at Madison, Wis., of a thoroughly equipped wood-testing laboratory. Established on a cooperative basis by the Forest Service and the University of Wisconsin, the laboratory will be formally opened on June 4 with appropriate exercises. The presence of representatives of the lumber industry and of practically all the wood-consuming industries will make the occasion an auspicious event.

What is the need of such a laboratory? Of what value will its work be that it should be assigned an important place in the program for forest conservation?

Since the report of the National Conservation Commission we have had better information than ever before on the waste that occurs in harvesting the forest and in using its products. It was shown that so far as the tree is cut up into sawn products the waste is about two-thirds, if the bark and small branches be included. Let us look a little into the detail of this matter. It is important.

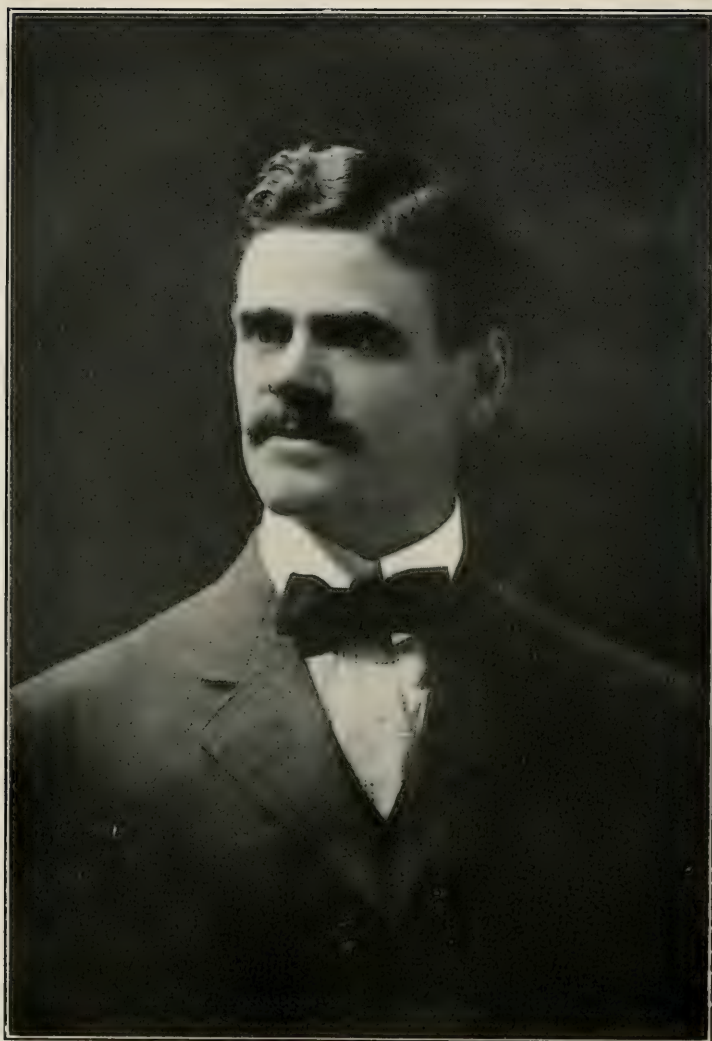
The wood which we cut down in the forest each year, if compacted together, would form a solid cube one-half mile square. It is taken from the forest by many industries. The lumber industry

takes forty-two per cent; cordwood thirty-two per cent, fence posts nine per cent, hewed railroad ties seven per cent, cooperage and pulpwood each two per cent. In manufacturing sawn lumber and its use by the industries, about sixty-seven per cent of the wood which grew in the tree is lost. In cordwood the loss is as low as five per cent, and in posts and rails it is only twenty per cent. In hewed cross-ties, however, the waste runs to seventy per cent, none of which can be used; and in cooperage stock waste reaches the enormous figure of seventy-eight per cent. Taking these several items which together take ninety-four per cent of the wood in the forest, we find that their combined waste amounts to thirty-eight per cent of the total. It is apparent, then, that considering the total amount of wood used, the waste approximates forty per cent, or two-fifths.

To aid in saving this vast waste is the work of one entire branch of the Forest Service, the Branch of Products, and it is the direct purpose of the Forest Products Laboratory.

PREVIOUS TESTS HAVE BEEN USEFUL

Now, the value of laboratory work in the economical use of wood has already been fully tested by the Forest



WILLIAM L. HALL

Assistant Forester, United States Forest Service, in charge of the Branch
of Products, Madison, Wisconsin

Service. For several years small timber-testing laboratories have been conducted in cooperation with Yale and Purdue universities and the universities of California, Colorado, and Washington. Some excellent results have been obtained in determining the strength and other properties of our commercial woods. Wood-using industries and engineers have profited by the information thus obtained, and the tests of the

Forest Service now form the basis of the specifications used in several important industries.

Confined as it was to timber testing, the work of these laboratories was too much restricted to yield the most important results. Facilities were needed for chemical studies, for wood-fiber investigations, for experiments in preservative treatment of wood, but none existed.



McGARVEY CLINE

Director of Forest Products Laboratory, United States Forest Service, Madison, Wisconsin

It is now five years since the first steps were taken to provide a laboratory in which all the necessary investigations involved in the use of wood could be made. An appropriation was requested from Congress, but was not secured. An attempt was made to lease a suitable building in Washington, but one could not be located. Contractors were found who were willing to erect a building such as was desired, but because a long-time lease could not be made, and because a building of the kind desired if vacated for its original purpose could be used for but little else, the proposed lease rate was so high as to make the project impracticable.

After considering many possibilities, we at last hit upon the idea of enlisting the aid of a university to secure the needed facilities. The matter was presented to several prominent institutions situated in the region within which it was considered advisable to locate the laboratory. Nearly all became interested at once, and three of them responded with very attractive propositions. These were the state universities of Michigan, Wisconsin and Minnesota. Not only were their propositions good, they became very eager to secure the prize. State pride was aroused. To decide between them was no easy matter. After careful and full consideration, the University of Wisconsin was



H. S. BRISTOL

Assistant Director of Forest Products Laboratory, United States Forest Service, Madison, Wisconsin

selected as having made an entirely satisfactory proposition and as presenting on the whole the most favorable conditions for work such as the Forest Service intended to do.

By the terms of the agreement which was entered into, the University has erected a building at a cost of about \$50,000, and will supply free of charge the heat, light, water, and power required in the work. The Forest Service has supplied the testing machines and other apparatus and will furnish the force of forty experts and assistants to carry on the work. By this plan of cooperation the United States secures the largest and most completely equipped wood-testing laboratory in the world.

ORGANIZATION BY SECTIONS

As to organization and working space, the laboratory is divided into three groups of three sections each. The first

group employs processes that are largely chemical and may be designated the chemical group. In it are the sections of chemistry, pulp, and distillation. The section of chemistry devotes itself to the study of the chemical constituents of wood and the composition of wood preservatives. The section of pulp investigations studies the fiber characteristics of woods to determine their value for various classes of pulp. The immediate work of his section, for which Congress has made a special appropriation, is to determine whether it is possible to find a substitute for spruce in the manufacture of ground wood pulp. The section of distillation has the interesting and important field of developing chemical by-products of wood by distillation processes. Undoubtedly, this section is to have great direct importance in reducing wood waste because many of our commercial woods are rich in such materials as alcohol, turpentine, oils, and gums.



H. S. SACKETT

Chief, Office of Wood Utilization, United States Forest Service, Chicago, Illinois

The second group of sections may properly be called the physical group, and contains the sections of wood preservation, pathology, and wood physics. Wood preservation covers the study of the treatment of wood by substances to improve its durability or appearance. The treatment of wood to improve its durability is rapidly becoming an important industry, and in the future it will work a great reduction in the waste which takes place in use because of decay, insects, and marine borers. Many of its fundamental problems are yet to be solved, however, and on these the laboratory will work. Closely allied with wood preservation is the section of pathology, which studies the diseases which prey upon woods. By an

advantageous cooperative arrangement part of its work. The section of wood physics will investigate the microscopic the Bureau of Plant Industry will man this section and supervise the technical structure of wood and the relation between structure and physical properties such as strength, toughness, and penetrability to liquids.

The third group contains two sections, which rest substantially on mechanical engineering. It may, therefore, be called the engineering group. The first of these is timber testing, which aims to build up, through mechanical tests, a rating table for the properties of our commercial woods. By means of the figures, when secured, we may classify woods according to

their relative value for specific purposes. The second section is that of engineering, and has to do mainly with design work. Whatever is accomplished in cutting down wood waste in any line will depend in great part upon the efficiency of the machines which will be designed to do the work. This section is consequently a very important one. Third in this group is the section of maintenance, which looks out for the general maintenance and unimpeded operation of the laboratory.

Each section is in charge of a trained man who has under him the necessary assistants. Over all the sections, and in charge of the laboratory is the director, Mr. McGarvey Cline. He has as assistant directors Mr. H. F. Weiss and Dr. H. S. Bristol.

OTHER WORK OF THE BRANCH OF PRODUCTS

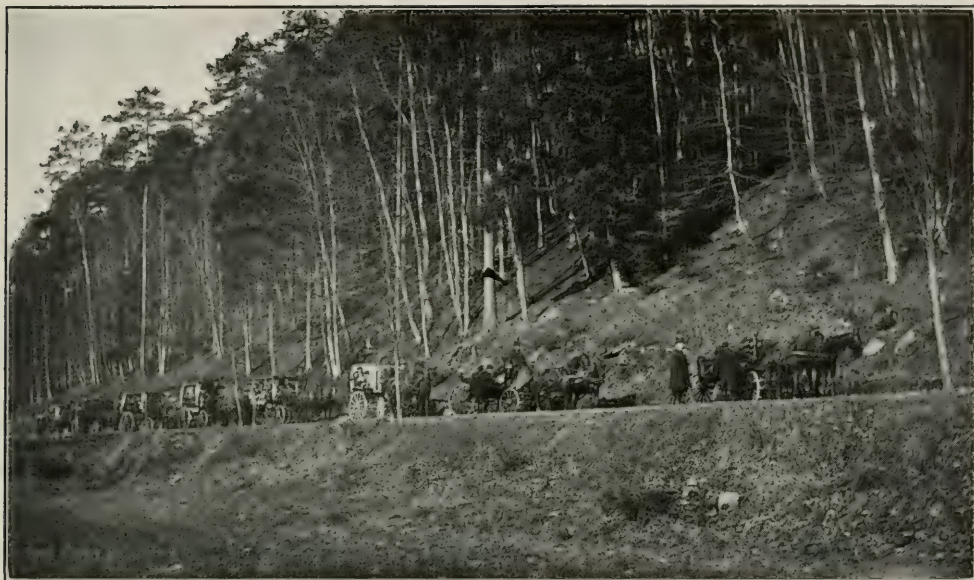
Correlated with the Forest Products Laboratory is the Office of Wood Utilization, with headquarters in Chicago. Its work is statistical, while the work of the laboratory is altogether experimental. The Office of Wood Utilization makes no tests, but is constantly gathering facts and figures which will promote economy in the use of wood. It makes studies of the wood-using industries of cities and states, learns their requirements, and aids them in finding supplies of cheap and abundant woods to take the place of scarce and costly ones. It finds out what the waste is and proposes methods for its reduction. It is also gathering a record of wholesale lumber prices at the mills and in the principal distributing markets. These are base lines run through the lumber industry, by which prices in one region or market may be compared with those in another, and by which may be determined in a broad way what influences operate to raise, lower, or hold steady the prices of lumber. This is a good thing, both for the public and the lumber industry. In charge of the Office of Wood Utilization is Mr. H. S. Sackett, with offices in the Fisher Building, Chicago.

The laboratory and the Office of Wood Utilization are represented by branch offices in Washington, Denver, San Francisco, and Portland, Oreg. These carry on the work in certain districts. The office which has administrative charge of all the several lines of work, already mentioned as the Branch of Products, has hitherto been in Washington, but on June 1 was transferred to Madison, from which place the assistant forester in charge will report to the forester in Washington.

All work conducted by the Branch of Products is done in close contact and cooperation with the lumbering and wood-using industries. It aims for practical ends which are linked with the processes of those industries and which can only be accomplished through the improvement of their processes. Consequently, it must keep in close touch with the industries to succeed at all, even in a minor degree. The industries do not resent this policy, but appreciate and favor it. They are anxious to see its objects accomplished. As an expression of their spirit in the matter, let me quote a part of a resolution adopted by the National Lumber Manufacturers' Association at its meeting held in New Orleans in April of this year:

"And, further, since the elimination of waste is as truly conservation as the growing of trees, we heartily approve the efforts of the government, through the Forest Service, to develop methods whereby material now wasted may be put to use, or for prolonging the life of forest products, and urge a continuation of such research and a liberal appropriation by the government for their support."

With this sort of spirit prevailing among the industries which are mainly concerned and with facilities such as are afforded by the new laboratory, it may be expected that valuable results will be accomplished. It is the determination of those who make up the working force that the great opportunity which is presented shall be improved to the fullest extent for useful work.



SEEING THE GERMAN FORESTS

En route to Trippstadt to see American white pine forests 120 years old

FORTY-FIVE AMERICANS IN THE FORESTS OF GERMANY

By HOWARD R. KRINBILL

GERMANY, the foremost military power and the third naval power of the world, has been invaded by forty-five Americans. During the past winter, the forests of the kingdoms of Prussia and Bavaria and Wurttemberg and the grand duchies of Baden and Hessen have been penetrated by these young men, sons of American lumbermen and forest owners, students of the Biltmore Forest School, in winter quarters at Darmstadt, Germany.

Few Americans realize the advantages to be secured in Germany by the forestry student. No musician underestimates the value of a study trip to the land of Handel, Mozart, Beethoven, Weber, Meyerbeer, and Mendelssohn. No artist hesitates to visit the home of Dürer and Holbein. No architect slights an opportunity to behold Co-

logne. No student of German considers his time wasted in the land of Lessing, Schiller, and Goethe. Similarly, the forestry student is attracted to German soil because it became the birthplace of forestry a century ago through the pioneer foresters Hartig, Cotta, and Hundeshagen.

To-day, the German forests are managed under the most highly developed system of scientific forestry in the world. The aim of the students of the Biltmore Forest School, however, is not to introduce any innovations upon their return, since the perfect German forestry system is no more suitable for the exploitation of the vast areas of American timber than American lumbering methods are applicable to the communal forests of Germany. The world's best working field for scientific studies in



AMERICAN WHITE PINE

One hundred and twenty years old, 33 inches diameter, Trippstadt, Germany

forestry is found in central and southern Germany, but for practical work in timber cruising, road, bridge, and railroad building, logging and milling, the Southern Appalachians and the forests of the Lake States of the United States form desirable working fields. The Biltmore Forest School is seeking these different sites adapted to the study of each branch of forestry, having a new working field each season of the year—winter, Germany; spring, Adirondacks,

and Southern Appalachians in North Carolina; summer, Tennessee; fall, Wisconsin and Michigan.

The excursion to Germany affords a chance for scientific study along the following lines:

1. Forest management, varying according to ownership (state, communal, and private), and according to type—pineries of the Rhine Valley, primeval white oak of the Spessart Mountains, hardwoods of the Odenwald, and spruce and silver fir of the Black Forest.

2. Silviculture—nurseries, reforestation, underplanting, thinnings.

3. The classification and distribution of the forest trees of the United States. *GERMANY has the world's best experimental plots of American forest trees and the world's oldest forest plantations of a variety of American trees, notably of white pine, Douglas fir, sequoia, western yellow pine, Port Oxford cedar, yellow cedar, western red cedar, Sitka spruce, and white fir.*

4. Botanical studies under Dr. Heinrich Schenck, president of the Darmstadt Technical University, editor of "Strassburger's Botany."

5. Forest protection, particularly against fires and insects.

6. Timber preservation—creosoting railroad ties and kyanizing poles.

7. Utilization of forest products with minimum waste at sawmills and veneer and furniture factories.

8. Forest economics; a study of the conditions, economic, social, and political, under which conservative forestry is more remunerative than destructive forestry.

9. Fish and game course, supplemented by visits to the hatcheries at Baden-Baden and the zoological gardens and museums at Frankfurt and Darmstadt.

10. American export lumber trade with Germany.

The achievement of seeing the best forests in Germany in only four months has been due primarily to the leadership of Dr. C. A. Schenck, who studied at the German universities twenty years ago, became familiar with German forestry under Doctor Brandis, acted as forester to the 125,000-acre Biltmore estate in North Carolina fourteen years, founded the first American forestry school twelve years ago, and now holds the honorary rank of Oberfoerster in Hesse Darmstadt.

The local German foresters have been glad to guide the Americans and explain the history and management of their districts. The experience of a score of the best foresters in Germany has been at the disposal of the school. The German forester knows not only his native species, but also the trees of the world, particularly those of the United States. To illustrate this fact, a brief description of some of the stands of American white pine visited by the Americans is given below:



AMERICAN WHITE PINE

One hundred and twenty years old, Trippstadt, Germany

1. In Rhenish Bavaria, in the Trippstadt forest, near Kaiserslautern, the white pine was introduced 120 years ago. To-day white pine standards twenty inches to thirty-three inches in diameter, breast-high, are found with a prolific second growth. The illustrations (Nos. 1, 2, and 3) show the high quality of these standards, as well as the thriftiness of natural reproduction. The price obtained for the White pine in the log varies from \$12.50 to \$49 per 1,000 board-feet, according to size.



AMERICAN WHITE PINE

One hundred and twenty years old; natural seed regeneration; Trippstadt, Germany

The stumpage price of White pine is higher than that of any of the native species, as shown by the price schedule below:

seedlings were outplanted per acre at an expense of \$10.60. Subsequent silvicultural treatment cost \$14.28 per acre. In 1908, the stand was fifty cords

	Diameter at middle of log, inside the bark				
	Less				
	20''-24''	16''-20''	12''-16''	10''-12''	than 10''
White Pine, per M.....	\$49.00	\$37.00	\$30.50	\$21.50	\$12.50
Scotch Pine, per M.....	26.00	23.00	22.00	18.00	14.00
Larch, per M.....	30.00	27.00	26.00	21.00	14.00
Spruce, per M.....	.....	25.00	23.00	20.00	16.00
Fir, per M.....	.....	27.00	22.00	19.00	14.00

The annual sustained yield on the 10,000 acres of Trippstadt forest amounts to 2,280,000 board-feet, the larger part of which consists of Scotch pine and spruce.

2. Near König, in the Odenwald, the white pines introduced 120 years ago by the Hessians who went to America to visit George Washington, have become twenty-two inches to thirty-four inches in diameter, breast-high. (See illustration No. 4.)

3. In Heidelberg Forest, experimental plots of white pine and other American conifers were started in 1887-1888; 2,735 two-year-old White pine

per acre. From 1903 to 1908, the average annual growth was three and eight-tenths cords per acre (cords of 128 cubic feet, containing eighty-five cubic feet of solid wood). A thinning of two and eight-tenths cords per acre in 1903 netted \$3.50 per acre. Illustration No. 5 shows the density of the stand, the uniformity of growth, and the clearness of the boles after pruning.

4. An excellent stand of White pine fifty-five years old is found near Isenburg, south of Frankfurt, in the delta region of the Rhine and Main rivers, where conifers form twenty-four per

cent of the forests, beech forty-six per cent, and oak thirty per cent, the soil being mainly sand over limestone. As early as 1430, oak acorns and pine cones (not *Pinus strobus*, for Columbus sailed sixty-two years later) were introduced from Nuremberg, and working plans were formed for the production of timber for boats and houses. In 1857, American white pine seedlings two years old were outplanted, with alternating rows of oak, the soil having been occupied by beech.

To-day, a dense forest of white pine, 285 trees per acre, averaging seventy-five feet in height and thirteen inches in diameter, breast high, is the reward for the careful work of the German foresters (see illustration No. 6). The average annual increment has been as follows:

Up to 1880. 1.6 cords per acre
Up to 1902. 2 cords per acre
Up to 1907. 2.1 cords per acre

The present stand, timber only, is 101 cords per acre.

The investment will prove remunerative, as the inferior Scotch pine brings \$15 to \$40 per 1,000 board-feet. The forests of this district cover 4,500 acres, yielding a net yearly revenue of \$5.50 per acre. The yearly planting expense is \$2,400, or 53 cents per acre on the entire area. The yearly road expense is \$1 per acre. Heavy investments of this character are possible only under favorable economic conditions, such as high prices for forest products, safety



AMERICAN WHITE PINE

One hundred and twenty years old, König, Germany

from fires, small forest area per capita of population, complete system of transportation without and within the forest, taxation based on soil productivity, agreement among owners to cut only enough to supply the demands of the consumer, ownership of state or community or corporation able to withstand long-time investments.





AMERICAN WHITE PINE
Fifty-five yearsold, Isenburg, Germany



AMERICAN WHITE PINE
Experimental plot, 24 years old, Heidelberg, Germany



PINERIES OF RHINE VALLEY

Studying a clear cut of Scotch pine, 114 years old, containing 10,800 board feet per acre, and 35 cords. Value of cut \$350 per acre



LOGGING TRAIN

Germany



LINCOLN DAY IN GERMANY

American forestry students celebrate at Darmstadt by unloading two cars of yellow poplar and oak from North Carolina



OAK LOGS IN GERMANY

These logs at Mitteldick are worth \$100 per thousand

THE MISSION OF EUCALYPTUS

By FLORENCE LILLIAN PIERCE, *Secretary of the Forestry Society of California*

MAN'S ingenuity is wizard-like. It has conquered earth, water, and air. It has controlled war, pestilence, and famine, yet the danger attending the rapid depletion and the foretold future exhaustion of the forests has taxed more than the genius of man. It has almost challenged nature.

The present outlook of the country from a forestry standpoint is appalling. Civilization is steadily crowding into the timber reserve; commercialism is denuding the hillsides of shade, warmth, drainage, soil, and water supply, to obtain merchantable lumber; and the official reports calmly state that unless some means of prevention or cure is taken, the forests will be exhausted in the measurable future.

The war debt can be paid, the government can levy a revenue to meet its expenses, but the forests have no means of conserving themselves, no natural method of sure, immediate, or rapid recuperation except through the assistance of man.

The forestry departments, national and state, and the forestry societies, have done much to arouse the country to a realization of the approaching forestal crisis. The result has been a spurt of economic forestry, so to speak. Denuded lands are being clothed with young trees; ugly scars left by forest fires are being hidden by sapling foliage; where there has not been shade enough for a humming-bird, miniature forests are waving; and the farmer who has a patch of trees, just for fuel, has grown conservative with his ax-strokes. Yet alarming conditions have been little bettered for immediate realization; because the time required for trees to mature to forestable age makes the present planting practically nothing but an impetus toward supplying woodlands for posterity.

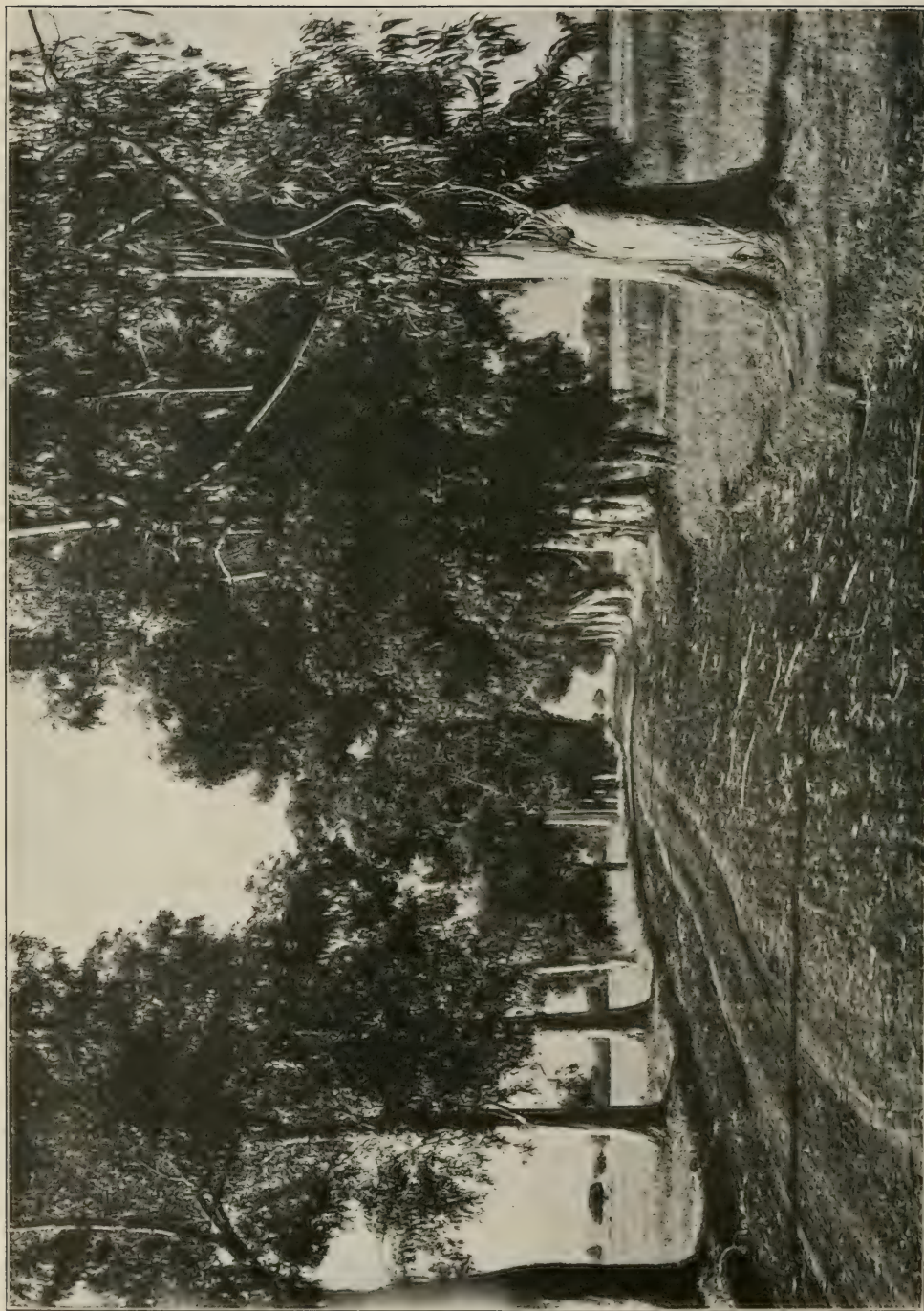
A wise proceeding; but something must be done to obtain results for us as posterity's ancestors. The man who is putting money in the bank for future use must have present sustenance. To conserve the forests for coming generations, there must be an immediate timber supply to meet the present existing demands.

The frenzied question has been and is, "How shall we fulfil the demand?"

The answer has come from the far-off island of Australia. In 1856 she sent us missionaries destined to become the saviours of the nation, missionaries that are to have an unerring influence on the geological, geographical, agricultural, industrial, and climatic conditions of the golden state—the eucalyptus trees, of Australian parentage, the adopted trees of California.

Missionaries there are who have been sent to far lands; others have remained in the home field; but who has heard of their being imported into this country? Yet it has been done, and remarkable are the things which the eucalyptus missionaries are to accomplish, and lasting are to be the results, for they bid fair to replace the trees that have been slaughtered; to become a substitute for much of the timber in current commercial use; to provide for future needs of the present generation; and to furnish forests for generations of descendants.

With remarkable tenacity to life, these trees rush in and grow where other trees are helpless to root; are cut down, and again reproduce from the hacked stumps. And therein lies the wonderful secret of their remarkable adaptability as a means of reforestation. The second growth, contrary to the habit of other trees to weaken in second production, furnishes a better quality of wood than the first, and through



EUCALYPTS AS SHADE TREES

These dimensions are attained in from ten to twelve years

time indefinite the tree stumps will reproduce and each growth is superior to the ones preceding. It is said that the eucalyptus never dies a natural death.

The eucalypts rival the garden weeds in their rapidity of growth; and they compete favorably with the hardwoods in strength, beauty, and texture. For every purpose for which wood is used, the eucalypts meet the demand. They may serve as forest blankets to cover hills and mountains, to conserve the moisture, to save the soil, to provide warmth and shelter from winds, and, while performing these duties, the trees are becoming invaluable for lumber and timber supply.

In spite of the critical and skeptical ideas concerning eucalyptus disseminated by those who have not taken the trouble to investigate with a view of determining the truth or falsity of extravagant statements, the fact remains that the eucalypts are the missionaries that will reforest our country, for the current time and for futurity.

The state and the nation are awake and rubbing their eyes to the possibilities of eucalyptus. The value of the trees for forest purposes in this country was practically unknown until recent years. True to its botanical name, which means "well concealed," the eucalyptus has reserved its qualities, it would seem, until a period in which they could be fully appreciated by the country which they have come to convert.

Eucalypts grow the most rapidly of any hardwood timber trees in the world. With only this quality to back them, they are invaluable in use to replenish the land devastated by forest slaughter, besides acting indirectly as the agents of good soil, moisture conservers, and exercising a perpetual climatic influence.

California has been especially honored by this imported tree, for outside of its native environment, eucalyptus reaches its fullest and most satisfactory development in this state. For years she played with this treasure, not knowing that through its cultivation she is likely to become the forestry angel of the nation. Of all the southwest, the

golden state has the monopoly of conditions favorable for the extension of the cultivation of eucalyptus, placing her in the enviable position, if she improves them, of supplying the United States with hardwood—that, too, without a long wait of years.

The value of a tree depends on its adaptability to the use to which it is put. Surely, a tree in whose trunk are stored the products which keep a great portion of the industrial world revolving, has proved its adaptability. The study of the trees made by the national and state governments has been extensive, and the reports issued, in favor of the eucalyptus industry, have led to liberal planting.

The maximum period of careful cultivation required by the eucalyptus is two years. After that the tree goes into partnership with itself and stores its crop values with the owner absent or present. Reasonable judgment in planting is sure to be rewarded with astonishing profits. The drawbacks that usually attend new industrial ventures are conspicuously absent in the cultivation of eucalyptus, unless attempts are made to grow the trees under exceptionally unfavorable conditions. Then toleration and patience are needed to stem a crisis or failure. Under half-way encouraging conditions, the industry is capable of practical management and becomes profitable. The future will see few barren hills or treeless deserts, for the towering eucalypts, with their blue-green foliage, will cover the unsightly and monotonous wastes.

Exaggerated statements have been made concerning the profits to be derived from eucalyptus growing. These are spread through ignorance, for a brief acquaintance with the tree and its habits shows any one that it is not necessary to overstate truths that are almost exaggeration in their veracity.

"By their fruits ye shall know them." Millions of these trees not yet planted and others not yet sprouted will be ready proof of their value inside of ten years or less.

To the golden state the culture of the eucalyptus means more than its gold



EUCALYPTUS

Second growth, six years old. This has not been thinned, the shoots being allowed to grow for fuel purposes

mines. The slender shoots planted to-day are to be the rescue of the state and nation for all of the to-morrows. The groves they produce will be standing, and yielding timber, when the cement buildings of to-day are crumbling in decay. We have the history of the remarkable longevity of life of these trees in their native country, Australia, to back the statement; and it is through such ceaseless productivity and clinging to life, and their rapid growth,

ranking them above all other hardwood trees, that the eucalypts of California will perform their mission of reforestation.

EDITOR'S NOTE.—The foregoing article puts effectively the views of Californians in regard to the eucalyptus. It must always be remembered that the eucalyptus is fastidious in regard to climatic conditions and can only be grown in certain limited areas of the southwest and possibly Florida. Other articles on this subject will appear later, one by the state forester of California.



EUCALYPTUS AS FOREST COVER FOR PARK

Los Angeles, California

WOMAN'S WORK FOR CONSERVATION

Notes from the Biennial of the General Federation of Women's Clubs

By MRS. LYDIA ADAMS-WILLIAMS

CONSERVATION was the keynote of the biennial meeting of the General Federation of Women's Clubs at Cincinnati during the second week in May, and the spirit of "Let's work for it with all our hearts" permeated the atmosphere of the great convention. Former Secretary of the Interior James R. Garfield was to have delivered the address at the formal opening of the convention, but he was prevented by illness in his family, and his place was taken by Rev. Charles Frederick Goss, who spoke of some of the phases of conservation, especially in its relation to the home, and of women's great part in it.

Friday, May 13, was Conservation Day, and it was the consensus of opinion that it was the best of all. At the general meeting in the morning in Music Hall, Mrs. F. W. Gerard, the able and painstaking chairman of the committee on forestry of the general federation, opened the discussion, submitting the report of her committee.

REPORT OF FORESTRY COMMITTEE

MRS. F. W. GERARD, *Chairman*

Madam President and Delegates:

It was the good fortune of your chairman of Forestry to begin her official duties by attending as delegate the conference of the National Conservation Commission, held in Washington, December, 1908. This commission was called to report, after taking an inventory of the nation's natural resources, in continuance of the work inaugurated at the memorable meeting of the governors at the White House, in May, 1908.

These meetings have passed into history, but they are regarded as making a national epoch, second only in importance to that at which the Constitution of the United States was framed. It has been truly said, that never in the history of any nation has a

statement so valuable been compiled and prepared; never has any nation known so well where it stands with regard to its national resources, and never has any nation had such a terrible indictment for profligate waste of its inheritance.

Two states have established precedents which are significant of the trend of public opinion toward European methods of forest administration, namely, in New York we have the first example of a privately owned reserve under state control; and the supreme court of Maine has recently rendered a decision in a hypothetical case, that the state can regulate the cutting of privately owned woodlands.

When four-fifths of our timber lands are in private ownership and only one-third of a tree is utilized in our wasteful system of lumbering, and only enough timber left to last thirty years, it can readily be seen that for our own interest the state or nation must soon interfere.

The most eminent conservation work begun by our Federation, the saving of the Big Trees, was brought to a successful conclusion last year. The credit for this belongs to Mrs. Lovell White, of California, who worked unceasingly for nine years, and finally, after personally interviewing every representative and senator in Congress, succeeded in her efforts to preserve these greatest living wonders. If no other work but the preservation of the Big Trees and the Palisades of the Hudson had been accomplished by our Federation, we should have justified our existence as an organization.

Another campaign to secure the passage of the Weeks bill has been very actively conducted this last year by the women's clubs. It is interesting to note that there is no sectional feeling among the women in regard to this question. In Colorado, which is the seat of hostility to all forestry reserves among the men, the women have worked unceasingly for this bill.

It is to be regretted that time is only allowed to present some of the most notable lines of work undertaken by the clubs. The reports show that thousands of trees have been planted, and that shade trees in towns and cities are becoming generally the wards of women's clubs; while this is valuable and necessary, the point should be emphasized that it is not forestry.

The Colorado federation last year was responsible for the expenditure of a fund of \$5,000 for trees and shrubs, and has distributed tree seeds to every club in the state, and is also using active influence for a great irrigation scheme at the present time.

Delaware clubs cooperated with the trustees of their university and secured a state forester, which is the first step that should be taken in a state desiring to establish a forestry system. Florida women were instrumental in securing the national forest reserves in their state.

The New England states and New Jersey are cooperating with their state foresters, to use their club audiences as lecture centers to spread the gospel of forestry. Hundreds of acres are now going under forest cover in Connecticut as the results of this system of education, the state forester, the president of the Connecticut Forestry Association, and the chairman of the Federation forestry committee forming a lecture staff. It is the opinion of your chairman that that is the best way to get actual results in forestation.

The civic division of the Iowa federation will put thousands of dollars of bluff park lands into the hands of commissions and cooperate with them in caring for it.

Illinois has been active in many directions. One club in Chicago succeeded in having the city forester appointed. The Belt line park system was the suggest of another club. The Federation is doing yeoman work to save the Ogle County white pines for a state reserve.

Maine also has worked for Mount Kahtadin as a state reserve. The state chairman of forestry for Kentucky has compiled a valuable manual of the trees of her state. Florida had a similar list prepared for the Federation by Mr. John Gifford, by request of the state chairman.

Mrs. Patterson, chairman for Indiana, has written a charming little play for the use of the schools on Arbor Day. Mrs. Wilkinson's efforts as chairman for Louisiana have covered a large field; she is responsible for the organization of a state forestry association. This is most valuable work, as it means an organized body, watching and working for state forestry legislation.

Ohio has only had a forestry department this year, but has already donated trees to a hospital, saved historic trees, and is working in many lines of civic improvement.

Notable work for school gardens is done by the City Federation of Saginaw, Mich. The Grand Rapids Woman's Club has bought land and planted it with trees. Nearly all the states are studying forestry questions, and are trying to have some elementary forestry introduced into the schools.

Our work for the Audubon Society is not as active as it should be. Can we logically work for conservation, and expect to be listened to, while we still continue to encourage the destruction of the song birds by following the hideous fashion of wearing song birds and egrets upon our hats?

We know that the insect pest has worked an economic change in agricultural processes, and if we wish we can, not only as federations but as individuals, render great service to the cause of conservation by refusing to be decorated with dead song birds. If women can raise freight rates because of the size of their hats, they can reduce the insect pest by changing the trimming.

It has been the policy of your chairman to urge the women's clubs to seek cooperation with existing commissions, associations, and persons engaged in forestry work in their respective states. Membership in the American Forestry and National Conservation associations is recommended. Conservation of native plants and birds are lines of work particularly in the province of women, and are therefore urgently recommended.

As all civilized countries but the United States have a quarantine law against imported nursery stock, and as more than half the agricultural insect pests have come to us from other countries, it is urged that we work for a national quarantine law against imported nursery stock.

The first recommendation sent to the clubs from your chairman is the last one—work to secure a state forester, or, if you have one, place yourselves under his direction.

The questions sent from this department were designed to be suggestive of lines of work, as well as to secure information. Realizing that they do not fully cover all the work, reports from chairman have been requested. Very few have responded.

Your chairman has delivered fifteen forestry addresses, visited two state federations, and been twice to confer with the forestry department of the New Jersey state federation.

Report from the Questions—1,876 Clubs Report

1. What especial line of conservation has your club undertaken? 150—Forestry, waterways, trees in cities, Weeks bill, and Hetch-Hetchy Valley.
2. Has your club assisted other associations in holding forestry institutes, lectures, or in introducing elementary forestry into the public schools or normal training schools? 266—Lectures and introducing elementary forestry in public schools.
3. Have you helped to secure any state legislation in behalf of forestry laws by letters, personal interviews, or petitions, such as forest fire laws, remission of taxes for afforestation, or appropriations for buying waste land for demonstration forests? 283—Have sent petitions and letters for state and national legislation.
4. Has your club studied any of the following forestry questions: (a) Raising Christmas trees as a crop, by the farmers? (b) Forest cover for reservoir lands? (c) The city or municipal forest for income and esthetic value? 168 clubs have studied some or all of these questions.

5. Are you helping the movement for bird protection or to prevent the extinction of the mountain laurel, arbutus, and maiden-hair fern? 250 clubs help bird protection.
6. Is Arbor and Bird Day observed in your public schools? 964 cities and towns keep Arbor Day.
7. Do you use the Forest Service bulletins? 218 clubs use Forest Service bulletins.
8. Do you cooperate with the tree warden or other tree official in your city. If so, in what way? And with what results? 240 clubs cooperate with city officials—excellent results.

In closing this report, it is a great pleasure to thank the members of the board and members of the forestry committee for their courtesy, and especially Mrs. Henry F. Brooks, the vice-chairman, whose instant response to every request and earnest cooperation in all details of our arduous work have been of the greatest assistance.

Respectfully submitted.

(Signed) JESSIE BRYANT GERARD.

May 13, 1910.

The best way to express Mrs. Gerard's interest and work for forestry is to say that she has been everlastingly at it for the last twenty years or more. She was chairman of forestry for Connecticut even before the general federation took up the work. Mrs. Gerard believes in doing rather than in talking and she always gets practical results from her efforts. She cooperates with the state forester and arranges meetings for the clubs, and the clubs advertise the meetings and make the local arrangements. She does much work before farmers' clubs, men's clubs, and women's clubs; these lectures by Mrs. Gerard always lead up to practical results, as planting and reforestation follow her addresses. Mrs. Gerard's special work for Connecticut is to get the different cities to get their reservoir sites under forest cover. Notable work has already been accomplished along these lines in Norwalk and South Norwalk, in Mrs. Gerard's home locality. "We all expect to do good work in New England," said Mrs. Gerard, "for we are all going to pull together, as our interests and needs all through New England are similar. Thousands of shade trees have been planted by the women's

clubs, and it would seem as if the shade tree is the ward of the women's clubs."

Gifford Pinchot was to have spoken at the morning meeting on "The Forest and the Family," but his absence in Europe prevented. This was a great disappointment to many who had counted on hearing him, but his place was taken by William L. Hall, first assistant forester of the United States Forest Service, who spoke on "Progress in Saving Forest Waste." Many who heard it pronounced this the best speech of the convention.

Mr. Hall paid a high tribute to the work women are doing for forest conservation, saying: "As one actively engaged in forestry work, I want first of all to acknowledge the wonderful service of women in forest conservation. The work has advanced notably, but without the aid of the women, who have given of their time and energy, for the sake of their convictions, it would not have made such appreciable strides. The women have sometimes led," said Mr. Hall, "sometimes been among the first followers, but they have never lagged. They were the first to sense the importance of this great movement, and not a single step has been taken except by the aid of the women of America. If we stop now," continued Mr. Hall, "little permanent good will result; all our work will be lost. What we have done will only amount to something if we go on."

Mr. Hall made the prediction that lumber prices will go higher and remain higher for a good while. He said the checking of waste of forest products can be accomplished by the cooperation of the lumber-using public and the government and the application of proper lumbering methods.

In speaking of the waste which threatens the destruction of the forests at present, Mr. Hall said the waste from the mills where spruce, hemlock, and poplar are sawed would produce all the wood pulp necessary to make all the paper produced in the country. Enough pine wood goes to waste in the southern sawmills annually, he said, to produce all the tur-

pentine the country consumes, and most of the nation's consumption of wood alcohol could be made from the waste in northern mills using beech, birch, and maple.

Mr. Hall declared there was also an uncalled-for waste when new lumber was used for the manufacture of such simple articles as meat skewers, when they could be made just as well from the trimmings from vehicle factories. He said the time would come shortly when the lumber-using public would have to be content to buy short lengths of lumber, and means would have to be taken to utilize the waste. Mr. Hall said that a concerted effort is being made on the Pacific Coast to put odd lengths of lumber on the market. He said it was a wasteful policy to buy sixteen-foot lengths and then cut them into four-foot lengths. He also said that from two to three feet should be the minimum length, instead of ten feet, as at present. Mr. Hall said that we cut every year wood enough to make a solid cube one-half mile square. Twenty-five per cent of this wood never is taken out of the forest at all, but goes to waste there. Thirty-five per cent is lost in slabs, edgings, sawdust, etc. Waste never ceases. Even when the wood goes into houses, chairs, ships, bridges, boxes, or ties, the waste continues. There is waste in the woods, in the mill, and in service. The causes of waste in use are fire, decay, insects, marine borers, or ship worms, mechanical wear, etc. Nine billion (9,000,000,000) board-feet annually is the estimated loss from these sources. This may be largely prevented through the preservative treatment of lumber by which the life of railroad ties, bridge timbers, paving blocks, posts, poles, etc., may be prolonged and their usefulness increased.



MRS. F. W. GERARD

Of Connecticut. Chairman of the Forestry Committee of the General Federation of Women's Clubs

There are at present eighty commercial plants for treating lumber with wood preservatives.

Mr. Hall gave an excellent account of the Forest Service laboratory, which will be opened at Madison, Wis., June 4, and which will be prepared to investigate all practical forest problems.

Mrs. Hoyle Tomkies, of Shreveport, La., president of the Woman's National Rivers and Harbors Congress, spoke at the morning session and at the conference in the afternoon. Special enthusiasm greeted her appearance, as her graciousness, tact, and executive ability have won her way to the hearts of all who have met her. She spoke of the work of the congress on behalf of the waterways, and made a plea for cooperation.

Hon. Joseph E. Ransdell, of Louisiana, president of the National Rivers

and Harbors Congress, and author of the slogan "A water policy, not a water project," aroused the women in the convention to great enthusiasm. He showed the function of waterways, free high-roads for all the people in preventing monopoly in transportation. Terminals on navigable waters, he said, should be public property and all transportation agencies by land or water should use them on equal terms. He declared the pending rivers and harbors bill to be the best ever enacted. It carries an appropriation of \$50,000,000; it is to be annual hereafter, instead of triennial; and it adopts a fixed policy for completion of the great projects within a definite period of time.

Another of the bright women who are earnest in conservation, Mrs. Emmons Crocker, vice-president for Massachusetts, of the Women's National Rivers and Harbors Congress, was one of the speakers, taking as her text "Wilful Waste Makes Woful Want." She spoke upon waste of soils, fertilizer, sewage, and minerals.

THE CONFERENCES

The afternoon conference on forestry was opened by Mrs. Gerard, and the work of a number of the state federations was reported upon. Especial distinction was accorded to the achievement of the Kentucky federation in publishing an admirable hand-book of the trees of the state, prepared by Mrs. Mason Maury, of Louisville, chairman of the forestry committee. Another work of publication is an outline for study classes in conservation, by Mrs. F. H. Tucker, chairman of the forestry committee of the Massachusetts federation.

Edwin A. Start, executive secretary of the American Forestry Association, was the speaker at this conference. He paid a high tribute to the work of the United States Forest Service, and to the national forester, Henry S. Graves. He laid down a conservation platform, in regard to which he felt sure there would be no disagreement, and on these premises discussed the question, "What

shall we do to be saved?" insisting that every one has a personal responsibility. Referring to the need of organization, he described the work of the American Forestry Association, its relation to such organizations as the General Federation of Women's Clubs, and the ways in which each could be helpful to the other. He took up the question of personal duty toward these questions, urging this point: "Study this question for yourself until you have a clear, intelligent understanding of its main principles at least." Having discussed this question of personal knowledge and the means of attaining it, he took up the application of this knowledge, which consisted in general in doing the task nearest at hand, passing along in the home the knowledge obtained by personal study, seeing that adequate provision is made in libraries and schools for informing the younger generation, practicing principles of tree and forest culture if a landowner, and promoting municipal, state, and national forestry. Above all, he made a plea for earnestness, sincerity, and thoroughness, as only work so characterized counts.

Mrs. S. B. Sneath, state chairman of conservation for Ohio, presided over the waterways conference in place of Mrs. John Dallas Wilkinson, the national chairman, and she immediately turned over the management of affairs to Col. John L. Vance, president of the Ohio Valley Improvement Association. He introduced Capt. J. F. Ellison, of Cincinnati, secretary of the National Rivers and Harbors Congress, who is always a welcome and pleasing speaker. Other speakers of the conference were Congressman J. E. Ransdell, and the two energetic field secretaries of the National Rivers and Harbors Congress, John A. Fox and S. A. Thompson, each of whom made an eloquent plea, urging the women to exert greater efforts to secure cheaper transportation and the better development of the waterways.

The national chairman, Mrs. J. D. Wilkinson, called a waterways conference for the following morning, at which Mrs. Lydia Adams-Williams presented the year's report for the District of Columbia Committee on Waterways.

SOME WORK DONE AND WORDS SPOKEN

Mrs. A. B. Avery, secretary of the Louisiana Forestry Association, is one of the tireless and efficient forestry and conservation workers who was present at the biennial. Mrs. Avery secured the passage by the Yellow Pine Association at New Orleans in January of a resolution relative to regulation of the cutting of timber to meet conditions of supply and demand. Mrs. Avery maintains a small nursery of her own, in which she planted 2,700 seedlings last year. Her object is purely philanthropic, the trees being furnished for public improvement. She recently donated forty trees, in pairs of different species, to be used on the grounds of a public school.

Mrs. Herbert M. Bushnell, of 1942 South Seventeenth Street, Lincoln, Nebr., who is general secretary for her state, takes a great interest in forestry. She prepared and read the first paper on forestry that was ever presented at her state federation. That was over twelve years ago. "I didn't know much about forestry then," said Mrs. Bushnell, "but I began to study up, and since that time I've done everything I could for the preservation of our forests."

One of the many bright women from Indiana, Mrs. Virginia Sharp-Patterson, who is chairman of the Forestry Committee of the Indiana Federation, has written a play, "The Lady of the Green Scarf," which embodies the need for conserving our country's natural resources, and which may be used as an entertainment exercise for schools, clubs, and Arbor Day programs. The book is prefaced by the following quotation from the writings of Mrs. Lydia Adams-Williams: "By inculcating in the children the precepts of economy in relation to natural resources, the entire sentiment of the nation may be changed in a single generation and convert this people from the most wasteful and extravagant to the most prudent and conservative."

All the friends of conservation, forests, and waterways, especially the officers of the Woman's National Rivers and Harbors Congress, were delighted to welcome back, safe, happy, and in

perfect health, from her round-the-world tour, their national vice-president, Mrs. Charles Warren Fairbanks. In company with her distinguished husband, she visited many foreign lands and was strongly impressed by the different forestry conditions in each of them. "In the Hawaiian Islands," said Mrs. Fairbanks, "I noticed particularly that there is a great deal of planting of trees, especially on the high mountains. Also in some places in China they are planting trees; but the conditions there are very hard; the people are poor and wood is scarce, and the soil has much of it been washed away by erosion. In Korea they are also planting trees. I was much impressed by the beauty of the German forests and the care which seems manifest in their management. I take an intense interest in all vital subjects for the betterment of humanity; consequently, I am much pleased with the work that the general federation is doing for conservation, and I congratulate them and the country in general upon the stand they have taken in this great movement." At the general federation meeting, Mrs. Fairbanks spoke in favor of the mountain laurel for the national flower, and suggested that the federation would aid the movement if it would endorse the laurel.

Another one of Louisiana's enthusiastic workers is Mrs. John Dallas Wilkinson, national chairman of waterways for the general federation, and state chairman of forestry for Louisiana. Mrs. Wilkinson is also chairman of the executive committee of the Louisiana Forestry Association. At her waterways conference she gave a very full report of the year's work, and said that thirty-nine states, including the Canal Zone, have taken up the work for waterways. The other ten states are interested and sent in reports showing activity and a desire to know more of the work.

Mrs. Samuel B. Sneath, of Tiffin, Ohio, the able state chairman of conservation, which includes forests, waterways, and mines, at the waterways conference, reported work for purifying, beautifying, parking, and making sani-

tary the streams. She has distributed literature, and worked in the schools and through the press. Mrs. Sneath says: "In Ohio we must protect the banks of streams from spring freshets."

The state chairman of forestry for Nebraska is Mrs. W. A. Harrison, of York, Nebr., of the well-known Harrison family who have done much patriotic work for the state, especially along forestry lines. In recognition of the work she has done, Mrs. Harrison is called "the tree woman." Mrs. Harrison says: "We have a woman's state conservation committee, and we have had two state conservation congresses in Nebraska. At the next state conservation congress to be held this winter, we shall have our woman's conservation committee recognized, and we shall have a woman speaker on conservation on the program."

"My publicity chairman for my conservation committee of forestry and waterways," continued Mrs. Harrison, "is Mrs. J. M. Ragan, 505 Bellevue Avenue, Hastings, Nebr. She is a sister of Governor Shallenberger, of Nebraska," said Mrs. Harrison, "and he is an ardent supporter of the conservation movement, consequently our conservation committee of forests and waterways expects to accomplish great things."

Mrs. Harrison said that in her state wherever there were women as college professors, superintendents, or school teachers, she received many requests for information on forests and waterways and conservation, but that she had not received a single inquiry from any of the male teachers, superintendents, or professors. This was probably because they did not know where to inquire.



SOME OBSERVATIONS ON FORESTS AND WATER-FLOW

By J. T. ROTHROCK

THE report, "The Influence of Forests on Climate and on Floods," recently published, by Willis L. Moore, chief of the United States Weather Bureau, though quite full and apparently intended to discuss in detail the entire relation of forests to water-flow, singularly enough omits entirely one most important aspect of the problem.

So far as I can discover, little, if anything, is said specifically of the influence of forests on water-flow *during the winter*.

The least reflection should have indicated that this merited special consideration, if for no other reason than that the problem of leaf-evaporation is almost wholly eliminated at that time and that this would materially affect the quantity of water retained by the soil for flow at the period of low-water stage.

There is, however, another and more direct relation to be considered, which seems to me to be of great importance. It is the capacity which the forest floor has *in winter* for receiving and retaining moisture as contrasted with the same power of the open, cultivated land, at the same time.

I am led to call attention to this by some observations made by me during the last winter:

It will be remembered that the summer, autumn, and early winter of 1909 were, in Pennsylvania—at least, in the eastern half—of exceptional drought. The soil was literally dried out. Springs and wells which had not, within the memory of living men, failed, ceased to flow. Cattle were driven and water hauled great distances. So it may be fairly assumed that the soil in forest

and in field was in a most receptive condition for any rain which might have fallen. December 13, there was, in Chester County (Pennsylvania), a remarkable rainfall of two and seventy-eight one-hundredths inches, and there was also some little snow before Christmas. This moisture was speedily gone, apparently, owing to the thirsty condition of the soil, and on Christmas day the drought was again so pronounced as to elicit general comment. There had been but little added to the general water-flow, and the country was still in a very suffering condition.

On Christmas there was a fall of snow which averaged in depth, on the level, from sixteen to eighteen inches. This was followed by a lowered temperature, and on the 28th the mean thermometer was twenty-one degrees. On the 30th the mean temperature was ten degrees. December 31, it was 17 degrees. The ground was solidly frozen to a depth of several inches. January 1, 1910, the mean temperature was twenty-seven degrees. January 2 it was forty-three degrees, and on the following day the mean was thirty-five degrees. It is needless to say that the snow was melting rapidly, though it showed but little corresponding flow in the fields, because, as the ground was frozen, most of the water was absorbed by the snow itself, and the country was in a slushy condition.

For several days I had been making observations in the woods and on the fields upon the condition of the surface soil. In the woods, where the leaves covered the ground, I found that it was possible to thrust an iron-shod cane without difficulty to a depth of eighteen inches into the earth, unless

it was stopped by a root or a stone. This was, no doubt, mainly due to the fact that the leaves had retained the heat of the earth, as our clothing retains the heat of the body. It is probable, also, that some heat was evolved by the process of decay in the lower portion of the bed of leaves. On the open ground, whether the snow still remained or had drifted away, the resistance to the thrust of the cane was solid, almost as if I had struck a rock. To this there was but one exception, where there was an unusually dense covering of long grass. Under a matted surface of this kind I could still thrust my cane into the ground of an open field.

It requires no argument to prove that in the dry, unfrozen soil of the forest the water could and did penetrate. It is equally obvious that it did not penetrate the frozen surface of the field. Had the thaw continued, there is no doubt we should have had a considerable rise in our streams, but on January 4 the mean temperature fell to ten degrees. Observations made on the morning of the 5th showed that where there was more water than was taken up by the snow it had run off on the surface, and what had not so escaped was frozen in the temporary channels on the fields. On the 5th the mean temperature was seventeen degrees. The thaw was arrested and the freeze was upon us. January 6 the mean temperature had risen to thirty-three degrees. There was also .33 inches of rain. January 7 the mean temperature was twenty-five degrees, and that of the 8th was eighteen degrees. January 9 and 10 it was twenty-five. January 11 it was twenty-two degrees.

The mean remained near the freezing point until January 18, when it rose to forty. There was at the same time (18th) half an inch of rainfall. The mean for the 19th was thirty-three degrees. On the 20th it was thirty-six degrees. On the 21st it was forty-five degrees, and on the same day the rainfall was .72 of an inch. My journal for the same date records that in the forest-tree nursery at Mont Alto I found the ground solidly frozen, though

in woods immediately adjacent the leaf-covered forest floor was not frozen.

At this time, on the mountain plateau, back of Mont Alto, at an altitude of 1,650 feet above tide, the rain and melting snow from the cleared land flowed over the road, and even the culverts were inadequate to remove the volume of water. I had never before, during a residence of six years, witnessed such a condition of affairs. But mark the contrast on the adjacent forest-covered slopes of from two to three thousand acres. The snow was melting there, too, and rain was falling on the forest floor just as rapidly as on the open fields. There was, however, no torrent, because the water was being taken up by the unfrozen soil of the forest. When toward the end, the stream which carried the water off did rise, the increase was small in comparison with the flood from the open ground.

I should add that the flow from the open ground went off by one stream, and that from the forest went by another, so that it was easy to make the comparison.

From the 22d of January until February 6, the mean temperature varied but a few degrees on either side of the freezing point. I merely allude to this to remark that the forest floor was still unfrozen, and the surface of the field remained frozen. The heat of the day was not sufficient to overcome the cold of the night.

During the nineteen days from the 6th to the 25th of February, the mean temperature was below the freezing point thirteen days, and the surface of the fields remained frozen.

The thaw which commenced on February 27 may be said to have broken up the winter. From the upper waters of the Susquehanna, almost to the Maryland line, vast quantities of melting snow were pouring out of the country. It was a flood of sufficient magnitude to have satisfied Mr. Moore's most exacting demand. Observations made at this time showed that the forest lands were still absorbing water. The most of the flood must, therefore, have come from the open ground, for the forest streams were not greatly swollen.

No doubt some of this water from the fields did, as surface water, aid in the temporary restoration of our springs and wells.

From March 1 until April 17 we had (in Chester County, Pennsylvania) but little rain. (The West Chester record kept by Doctor Green shows but 1.37 inches.)

The country was again suffering from drought. Farming operations were delayed because of the condition of the soil. Complaints were again heard because of shortage of water. The relief obtained from the surface flow in the last of February was ceasing. It is fair to say that probably most of the water available just prior to the

bountiful rains of the middle of April came from our forest ground storage.

Where the leaves and humus on the forest floor have been destroyed by fire the ground freezes, just as it does in the open field.

I am aware that there come times when the ground freezes in the forests as well as elsewhere, but I also know that in our Central States this is the exception rather than the rule.

Mr. Moore could not have been ignorant of facts like these, and of their bearing upon the question he was discussing, but the wonder is that he did not make specific allusion to them in so extended a paper as "The Influence of Forests on Climate and on Floods."

THE HISTOLOGY OF RESIN CANALS IN WHITE FIR

By C. D. MELL, Assistant Dendrologist, Forest Service

INTRODUCTION

IN CLASSIFYING the woods of conifers by their structural characters, they are usually divided into two groups; first, those that contain resin canals in the secondary wood, and, second, those in which resin canals are wanting. All conifers so far investigated have resin passages or resin sacs in their leaves, bast, or primary wood. *Pinus*, *Picea*, and *Larix* are usually regarded as the only ones that have resin canals in the secondary wood of both stems and roots. Von Mohl¹ states that resin canals are not present in the wood of white fir, *Abies pectinata* D. C., while Schacht² declares that resin canals are wholly wanting in the wood of all species of *Abies*. Following the announcement of these observations, Dippel³

studied numerous samples of wood of white fir from trees grown under different soil and climatic conditions. The samples were taken from different parts of trees thirty to 100 years of age. With these samples Dippel proved conclusively that resin canals are not entirely wanting in white fir; that they occur less frequently than in the wood of pine, spruce, and larch. The isolated wood-parenchyma cells are invariably associated with the production of resin, and for this reason are termed resin cells; when they enter into the composition of compact groups of cells leading to the organization of secretory passages they are termed resin canals.

The building of resin in these passages is dependent upon the starch in surrounding wood-parenchyma fibers, but it must not be taken for granted that all starch is consumed in the formation of resin, for a great deal is used in other processes. The origin of resin in resin canals is the same as that in small groups of resin cells. As has al-

¹*Bot. Ztg.*, 1860, No. 30, page 337.

²*Bot. Ztg.*, 1862, Nos. 48 and 49.

³*Bot. Ztg.*, 1863, No. 35, page 253.

ready been stated, the contents of young cells is gradually converted into an oily mass and eventually into resin. Transverse and longitudinal sections of older shoots show that during the winter the resin cells are filled with semi-fluid resin occurring either in the form of a thin layer or in small globules.

For convenience of study, Dippel grouped the resin-containing elements in the wood of white fir into single resin cells, large groups of resin cells, and true resin canals. He briefly described the structure of the different groups, their relation to the surrounding tissue, as well as the form and function of the individual cells composing the different groups. The following are the chief facts brought out by Dippel:

DESCRIPTION OF GROUPS

1. Among the single resin cells may also be included small groups of from two to four resin cells (transverse section) found in the wood of the roots and stems (Fig. 1). In the latter they

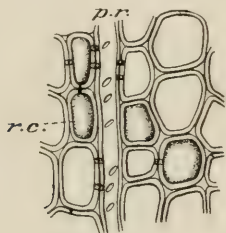


Fig. 1.

usually occur among the thin-walled tracheids of the early wood (spring-wood of Schacht), and are seldom present among the thick-walled cells of the late-wood (fall-wood of Schacht). In wide concentric zones of roots they occupy a similar position, but in narrow zones they are found either among the thick-walled tracheids of the late-wood or in the transition zone between early and late-wood. They are found in all genera of the coniferæ except in *Pinus* and *Picea*, and in structure are similar to those of the wood-parenchyma fibers in Dicotyledonous woods. The individual cells composing these fibers form a

perpendicular row of elements that have either horizontal or oblique cross-walls and contain numerous simple pits. Where the side-walls of such elements are adjacent to other elements of the same order or border on pith ray cells the pits are invariably simple; where they are adjacent to tracheids the pits within the walls of tracheids are bordered, and within the walls of the wood-parenchyma fibers are simple, semi-bordered pits. The character of pits in resin cells correspond exactly with that of pith ray cells. The pit cavities within the walls of tracheids adjacent to resin cells are invariably smaller in diameter than those in the contiguous walls of tracheids. The lumina or central cavities of the resin cells are somewhat smaller than those of the surrounding tracheids which are the elements forming the ground mass of coniferous woods. The average length of the resin cells is between .30 and .35 mm., but they have been found to vary from .15 to 1.05 mm.

In older parts of stems the majority of resin cells are completely filled with resin, while others have thick layers of resin deposited on their inner walls. There are individual cells that are filled during the winter with starchy matter the same as the pith ray cells. In the wood of ultimate twigs resin cells are filled almost completely with starch. With the beginning of the season's growth the starch disappears and a strong light-refracting solution that is volatile and soluble in alcohol takes its place (Fig. 1). In the older portions of the twig the number of starch-containing cells diminishes and those of oil and resin-containing elements increase. In longitudinal section of one-year-old twigs it is found that the cells near the end of the twig contain starch, while those farther back contain merely an inner layer of resin. Here and there starch grains and resin (Fig. 2, r. c.) are often present in one and the same cell.

2. *Large groups of resin cells*, with which may be classed all those groups that consist of from six-twenty or more, are usually found just inside the

concentric layers of thick-walled tracheids of the late-wood (Fig. 3). Small groups of resin cells may be distinguished from the large groups by the fact that the latter are always sur-

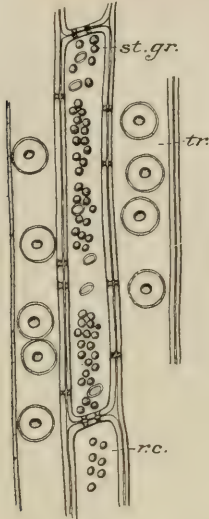


Fig. 2.

rounded by several rows of wood-parenchyma fibers containing starch during the winter. The structural characters of the wood-parenchyma fibers of the single resin cells are similar to those of the large groups, though they are usually much longer, some-

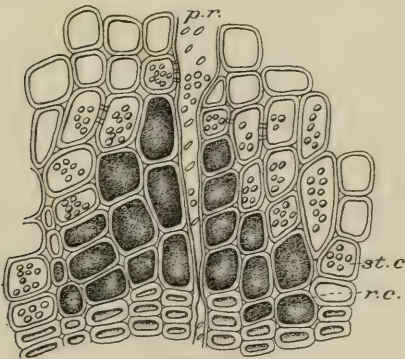


Fig. 3.

times from .8 to 1. mm. in length. The individual starch cells of the wood-parenchyma fibers are very much shorter than the resin cells, varying in length from .08 to .2 mm.

3. *True resin canals* are present in the wood of the roots, stems, and branches. Dippel investigated sections of wood cut from different parts of the tree and determined that resin canals are perpendicular structures extending for a considerable distance, and that they are not wholly independent of each other, but communicate with one another here and there. Dippel also pointed out that resin cells originate as such in the cambium, but for lack of proper material he was unable to follow in detail their subsequent development to maturity. A very careful investigation of resin canals in young twigs, and

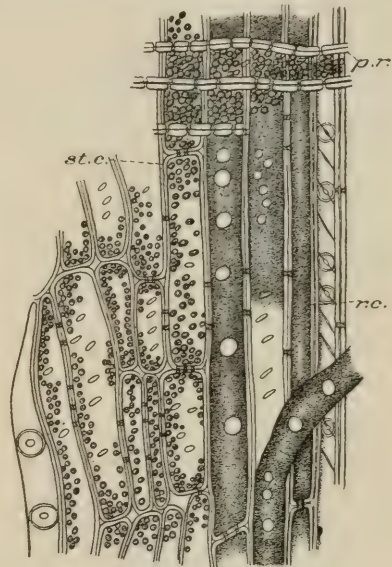


Fig. 4.

also in mature wood cut from many different parts of the stem, yielded important facts from which Dippel made interesting deductions relative to the origin and development of resin cells, and which served him later in his study of resin canals in *Pinus*, *Larix*, and *Picea*. He found resin canals in all samples of white fir and determined that their presence cannot be regarded in any way as abnormal. He also found individual resin sacs similar to those present in other coniferous woods, and concluded that they are a result of abnormal cell development and a subsequent disorganization of their cell walls.

Resin canals in white fir occur in small groups of two to six or more in the early-wood, and usually near the inner boundary of concentric zones (Figs. 5 and 6). These canals are always in direct communication with pith rays (Figs. 5A, 5B, and 6), and are surrounded by wood-parenchyma fibers that contain starch during the winter (Figs. 5 and 6 st. g.). Transverse sections of twigs cut from the top of the tree show that young resin canals consist of compact groups of cells, the central portions of which are composed of

of cells are similar. The pits are simple, and only where resin cells touch tracheids do they appear to be bordered; such borders are always within

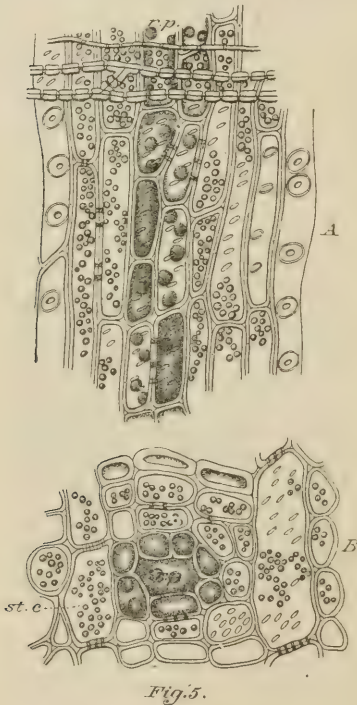


Fig. 5.

numerous round cells with wide cell cavities, but in other respects are similar to the cells that are filled with starch during the winter (Fig. 7). In the early spring, when the vegetable period begins, the starch is replaced by a volatile oil, and during the first winter there is no trace of resin in these cells. Longitudinal sections show that resin passages are surrounded by wood-parenchyma fibers, the cells of which are from two to three times as long as those in the center of the group. In other respects the inner and outer rows

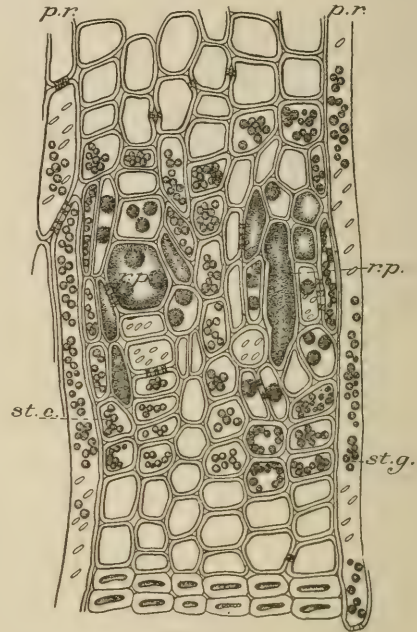


Fig. 6.

the walls of the tracheids. The cells of the young resin passages are filled during the winter with starch (Figs. 7 and 9), which is eventually converted into a fluid mass and later into resin. Trans-

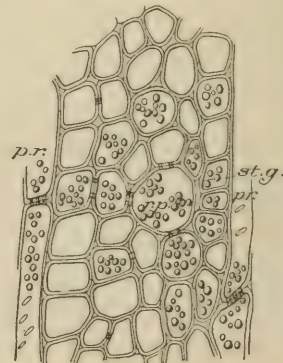


Fig. 7.

verse sections of two to four-year-old twigs exhibit structures similar to that of one-year-old twigs. There is, however, a difference in cell content. In

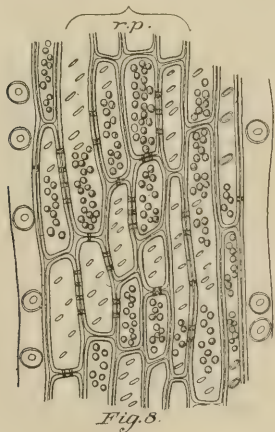
older twigs the large central cells of resin canals surrounded by longer cells of the same kind contain small globules of resin, and rarely a uniform thick inner layer.

The general structure of resin canals is exactly alike in all parts of the stem. Transverse sections show that the cells in the central portion of the canal have wide cavities and are surrounded by shorter resin-containing cells. The outermost cells are longer and contain starch in winter, and in the beginning of summer contain volatile oil. Such cells are always in direct communication with the pith rays.

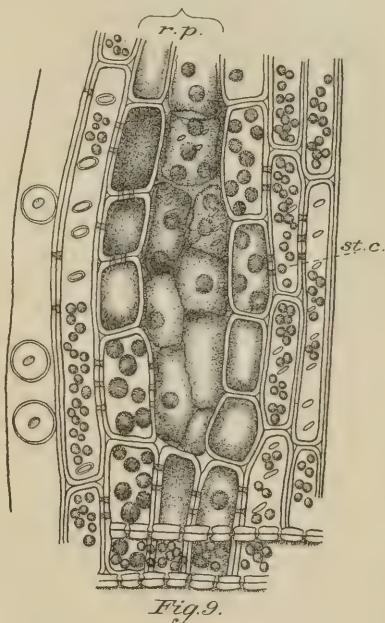
Resin canals originate from rows of wide cells above referred to, or by the gradual disorganization of the central

with their cross-walls partly or wholly absorbed. In older twigs all gradations of disorganized side and cross-walls occur, which gradually dissolve, and canals with smooth side-walls develop. The cell-walls within the resin canal are sometimes found intact (Fig. 9). The simplest form of resin canals consists of one perpendicular row of resin cells.

The wood-parenchyma fibers in the uppermost part of one-year-old twigs contain starch during the winter, the same as the pith-ray cells. In older wood the starch is replaced by a semi-fluid resin in which there may be a few



cells of a group. Seen in a longitudinal section, the canal that is filled with resin appears to have been formed by the absorption of the walls of resin cells. Such sections show that resin canals are not continuous, but that there are places where the cross-walls have not been wholly absorbed. Twigs from five to ten years old are best for studying the development of resin canals, because in older wood they are already fully developed. If the canals consist simply of wide central cells, such elements may be seen either in their original form or with their cross-walls perforated or totally absorbed. In this stage the side-walls have undergone very little change, and the canal merely consists of one or more rows of cells



grains of starch. After growth has started in early spring the starch gradually disappears, and the cells become filled with a fluid mass which is later transformed into a yellowish or reddish-colored resin. The resin gradually hardens and forms an inner layer or occasionally fills the entire cavity. Longitudinal sections of young twigs show perpendicular rows of wood-parenchyma fibers that contain starch grains in the uppermost cells, while the lowermost ones contain starch and resin or resin only. The starch grains which originally filled the cell cavities

are replaced by a fluid mass which is further transformed into resin. A comparative study of resin passages in young and old parts of stems shows that there is no visible change in the cell-walls while the resin hardens. Careful measurements also show that the walls do not diminish in thickness whatsoever, whether the resin is merely deposited in thin layers or whether the cavities are completely filled.

In the large groups of resin cells, the behavior is similar to that in the small groups. The entire parenchymatous tissue in the younger parts of the ultimate twigs is filled with starch. In the older twigs the cells toward the inner part of the stem are filled with resin, while the wood-parenchyma cells surrounding them are filled with starch during the winter, and during the summer contain a liquid resembling turpentine. The starch yields material for the manufacture of resin. Similar conditions are present in the older wood. The resin mass eventually becomes so hard that it may be removed from the canal without breaking it (Fig. 4).

There is a continued increase of resin mass in the cells of old wood by the conversion of starch cells into resin cells. This is shown by the fact that old wood contains more resin cells than younger wood. A comparative investigation, however, affords no definite information as to when this process ceases.

The origin of the resin is, therefore, dependent upon the conversion of starch into a fluid mass resembling turpentine. Later it is diffused from the outer into the inner cells, where it undergoes further change and is converted into resin. The normal increase of resin is, therefore, supplied by the surrounding starch cells. The new supply of converted starch always passes on toward the inner cells of the group for the formation of resin.

The conclusions derived from this investigation are that the resin-containing elements in the wood of white fir can be conveniently grouped as follows:

1. *Resin Cells*.—Wood-parenchyma fibers (Hartig's cell-fibers) are usually scattered among the thin-walled trach-

eids, and invariably contain resin in old wood.

2. *Large Groups of Resin Cells*.—Large groups of elongated wood-parenchyma fibers containing resin are invariably surrounded by elements that may or may not contain resin in the older parts of the wood.

3. *Resin Canals*.—True resin canals are always surrounded by wood-parenchyma fibers that are invariably in communication with pith rays and contain starch.

The investigation also shows, first, that resin in the white fir originates in the wood-parenchyma fibers and that it never occurs normally in tracheids; second, resin is developed by the conversion of starch in wood-parenchyma fibers; third, that true resin canals are developed by the disorganization of cell-walls prior to the hardening of resin; and fourth, that the formation of resin canals must not be considered as a cause, but as a result of resin development.

EXPLANATION OF FIGURES

The illustrations are magnified 280 diameters and are slight modifications of those given by Dippel in *Botanische Zeitung*, 1863, p. 253. The abbreviations used with these figures are as follows: r. c., resin cells; st. c., starch cells; st. g., starch granules; r. p., resin passage; p. r., pith ray.

Fig. 1. Transverse section showing a small group of resin cells partly filled with a semi-fluid mass.

Fig. 2. Longitudinal radial section showing cells of a wood-parenchyma fiber containing starch granules.

Fig. 3. Transverse section showing a larger group of resin cells just inside thick walled tracheids of the late wood.

Fig. 4. Longitudinal radial section showing hardened resin in resin canal.

Fig. 5A. Longitudinal radial section showing resin passage with certain cells partly filled with resin.

Fig. 5B. Transverse section of a resin passage.

Fig. 6. Transverse section of a resin passage among the thin walled tracheids of the early wood.

Fig. 7. Transverse section of a resin passage in a young twig prior to the formation of resin.

Fig. 8. Longitudinal radial section of resin passage in young twig prior to the formation of resin.

Fig. 9. Longitudinal radial section of a resin passage, showing partially dissolved side and cross walls of the original resin cells.

THE NEW CANADIAN REGULATIONS

LUMBERMEN and paper and pulp manufacturers, as well as all users of print paper, are watching with much interest the action of Canada and of the Canadian provinces in the way of protection of the timber resources of the north country by means of regulations and prohibitions. The action of the provincial government of Quebec in prohibiting the exportation of pulpwood from the crown lands of the province was not unexpected, but the definite announcement of this action, coupled with the statement that it has been carefully considered and is not temporary or retaliatory, but is to be a permanent policy for the protection of the timber resources of Quebec has, as might be expected, been the subject of much discussion on this side of the line, especially in the trade journals.

The St. Louis Lumberman, after indicating quite fairly the strong reasons leading to the action of the Quebec authorities, nevertheless regards this action as a "petty and unfortunate exhibition of unneighborliness, following so closely on the heels of tariff negotiations by Canada," and thinks that under the circumstances it looks "like a bit of calculating, tricky politics." This journal believes that our paper mills will "discover that there are plenty of home woods that can be used in the manufacture of paper to the entire neglect of the Canadian spruce," and that "the Quebec prohibitions of pulpwood exports may, in the long run, prove to be a blessing in disguise for American paper mills and American forest owners alike."

The Paper Mill and Wood Pulp News is reserved in its expressions of opinion. Its Washington correspondent says "that the decision of the Quebec authorities is designed to benefit Canadian labor is the general belief of the Washington officials. Ultimately, they think,

it will result in the establishment of pulp factories in the province, thus reducing by so much the manufacture of pulp at American factories."

On the Canadian side of the line, opinion in regard to the Quebec prohibition is not unanimous, but as reflected by the leading Canadian trade papers it seems to be largely favorable. *The Canada Lumberman and Woodworker* finds the course of Quebec justified by the similar action of Ontario in 1897 in regard to sawlogs. It says:

It is to be hoped that the result will be the adoption of a definite policy of protection of the forest resources of the province from reckless exploitation in the interests of the consumers of a foreign country. If properly cared for, the forest resources of Quebec will provide a perpetual supply of pulpwood sufficient to furnish paper not only for the province itself, but for many outside markets. Undoubtedly history will repeat itself in Quebec and we shall see in the near future the establishment of large paper mills in various parts of the province, to turn into finished product the raw material which until now has been shipped to the paper mills of the United States.

Noting the dissatisfaction felt by the lumbermen of Quebec, in common with those of Ontario, at the coincident increase in stumpage dues and ground rent, by which the governments of these provinces seek to share in the unearned increment, this journal thinks the lumbermen may find their industry so greatly benefited by prohibition of export that "they will overlook the increase in the stumpage dues and ground rents." It continues:

Legislation prohibiting the export of pulpwood was not only necessary but imperative, if the industry was to be saved from extinction. United States paper mills have been for years the only industry to secure the benefit of Quebec's pulpwood. Naturally, the people who are interested in United States mills are now confusing the issue with their own political affairs. Paper manu-

facturers of the United States are accused of having contributed to the present situation by clamoring for a high protective duty upon paper, and for free import of pulpwood. It is argued along the same line that the prohibition of the export of pulpwood by Quebec is an act of discrimination against the United States which would justify the imposition of the maximum tariff, if it were not for the fact that the governments of both countries are now considering the feasibility of introducing a measure of reciprocal trade relations, which will perhaps include a settlement of the pulpwood question.

The people of the United States are drawing the wool over their own eyes in connection with this matter. If the action of Quebec in prohibiting the export of pulpwood were in reality an act of unneighborliness and not one of self-protection, there might be reason for complaint on the part of the United States, but there is no question that the people of Quebec are adopting the only reasonable course for the preservation of their natural resources, and that, irrespective of any question of mutual good-will, it is imperative that this prohibition be continued even at the expense of the paper-making and publishing industries of the United States. The interests of the people of Quebec are paramount in the preservation of their own resources, and those who finally have to deal with the matter in the United States should be easily convinced of this.

That the action of Quebec was not influenced one way or the other by the tariff question is illustrated by the public utterances of Premier Gouin and several others of his government, who stated long ago that the present action would be taken before September, 1910. Premier Gouin, in making his announcement regarding the matter in the legislature, shed further light upon the situation by saying that the reason for his delay in making an announcement upon the subject was that he wished to avoid any interference with the tariff negotiations which have only recently been concluded.

In its issue of May 15, the same journal notes criticism of the prohibition ordinance both in the United States and Canada, saying of the latter

that there is only one criticism which "can reasonably be directed against the measure, namely, that the smaller owners of pulpwood in the province will be cut off from the United States market and will suffer heavy loss until mills can be built in Quebec to use their pulpwood." It believes, however, that the demand for paper and the advancing prices will lead to the building of mills without delay. The claim is made that this action has nothing to do with the "tariff tangle," but is a "direct development out of natural conditions." While "the loss to the United States newspapers, if it really becomes extensive, will be regrettable enough," the loss which "the people of Quebec are concerned in most closely is one which they have already submitted to for many years, *i. e.*, the loss of their own natural resources, and the permanent injury resulting from the placing of these resources under the control of a foreign people." It thinks the United States can have no ground for offense if Canada follows the course that has made the United States so prosperous.

This is directly in line with what AMERICAN FORESTRY has already said, that we cannot look to Canada to help out our diminishing timber supply, since our neighbor's resources are not so limitless as some suppose. We have already cited the opinion of a German government expert, sent to examine Canadian conditions, to the effect that Canadian forests can only take care of the home demand in the near future.

The Maritime provinces, it may be noticed, are taking steps to similarly protect their crown lands.



EDITORIAL

We Must Eliminate Waste

GOOD conservation consists no less in economies of operation than in the development and maintenance of sources of supply. This side of the question must come more and more to the front, for we have been sadly wasteful in all our operation and use of natural resources. To eliminate waste by greater care and economy and by more thorough and scientific methods must be our effort.

We find in several of the leading lumber journals frank admission of the fact that there is chaos in the field of production and distribution of lumber. This has been especially noticeable recently in discussions of the yellow pine situation. Over-production and wasteful milling throw upon the market a larger amount, especially of low-grade material, than the market really calls for. This surplus has to be "dumped" somewhere, at prices often not remunerative to the manufacturer, while the whole process is wasteful, unbusinesslike, and tends to unnecessary forest destruction.

Then there is the enormous factory waste so characteristic of much of our manufacturing. That suggestive magazine, *System*, in an article entitled "What Wanton Waste Means to You," points a moral here by naming two towns, one in Wisconsin and one in Michigan, which started on an equal basis but have separated on the high-road—one becoming a dead town, the other a live and prosperous one with a promising future. The difference lay in the spirit and method in which their resources were utilized. Both based their industries on the surrounding timber supply. One wasted its forest products in its mills so that the local supply became exhausted, and plant after plant had to shut down. There was left a waste country where once

had been productive forests, and, as the natural sequence, a moribund town.

In the Michigan town, on the other hand, a study was made of the utilization of waste and industries were developed with that in view. The first of these towns represents the old, careless spirit of a country over-rich with the bounty of nature, the second stands for the new, conserving spirit that is coming to the salvation of the country just before it is too late.

We are using ten times more lumber per capita than France and seven times more than Germany. We must not go on doing it. We must provide for the future, not only by increased production, but by eliminating waste.

In his thoughtful and instructive address at the biennial of the General Federation of Women's Clubs at Cincinnati, Mr. William L. Hall, of the Forest Service, emphasized this matter as one of the important and vital things in forest conservation, bringing facts and figures to support his position and indicating some of the steps that are being taken in the way of scientific experiments by the service to guide us in accomplishing the result.

Another recent address on this subject was made at the annual meeting of the National Lumber Manufacturers' Association, by Capt. J. B. White, who discussed from the operator's point of view the utilization of waste in forest and mill. This address was a real lumberman's gospel of good works. Captain White said that his subject led into the entire science of forestry. He pointed out how the production of wood must adjust itself to the conditions of the country, those regions, chiefly mountainous, which can do that to the best advantage, growing forests, while other regions blessed with a rich soil will produce the other needs of a civilized people, general profit arising from the interchange. This, it may be interpo-

lated, illustrates the national incidence of this whole question, because all sections alike have to use the forest products which not all may profitably produce.

Lumbermen, Captain White urged, should be as diligent in conserving forests and making their land produce a paying crop as farmers in studying the production of agricultural crops and the maintenance of soil fertility. We quote the following particularly suggestive statement:

In the south we are cutting over two and a quarter million acres of yellow pine every year, or about 7,500 acres every day, producing 13,000,000,000 feet of lumber each year, and twenty per cent waste makes the enormous sum of 2,600,000,000 feet of lumber. This means loss to the transportation companies in freight of 173,000 carloads each year, and at \$7 a thousand means an annual loss to labor of \$18,200,000. And in the entire Nation we are cutting 40,000,000,000 feet annually, leaving 8,000,000 acres a year of cut-over lands, and a total waste from unsalable low grades of at least 6,000,000,000 feet, or half a million carloads annually lost to the country. Add to this the estimated loss of \$50,000,000 by fires every year, and we have a total loss to the Nation and to the world of over \$100,000,000 per annum.

At this rapid rate of forest cutting, somebody will soon have to plant trees, and it is best that we should begin soon. There are doubtless localities in each state where some variety of trees can be produced more economically and profitably than other crops. Trees do not exhaust the soil, and they thrive on soil that has been exhausted by other crops. It is our duty to study forestry, our greatest prosperity is coming through the practice of wise methods, and it is the great privilege and duty of lumbermen to help lead in this great work, and not leave it to mere theorists and to impractical and unwise politicians to pass laws that will not only injure lumber manufacturers, but will injure the cause of forestry.

Referring to the prohibition of pulp wood exports from Canada, Captain White found this a text, also, for he held that we must meet such limitations of our supply by learning to utilize the waste of cottonwood, yellow pine, fir, hemlock, and other woods to make paper. In this connection there is an illustration given by the writer of the article in *System*, to which we have already referred. The New York and Pennsylvania company, which is pri-

marily a paper company, sends all its clear logs to the sawmill, making pulp from slabs, tops, and imperfect trunks. This problem of saving of waste is many-sided, as will be seen. While its fundamental principle is simple, it has an infinite variety of applications.

We can by reforestation and intensive forest cultivation make two trees grow where one grew before. This is a great work and must be done to supply the ever-growing demand. Moreover, it appeals to the sentiment and the imagination. But there is the other method of saving that we must also learn to practice of making one tree do the work that we have been accustomed to use two for. This is a homely method and does not appeal to the imagination at all, but it is a good practice and quite as necessary as the other. We must work at this thing from both ends. The first is the task of the state, the capitalist, and the land owner in varying degrees. The second is the task of every one who uses wood, and especially of the manufacturer, who handles it in considerable quantities. It involves the application of science, care, and industry.



The Forest Products Laboratory

WE PUBLISH this month the fullest statement that has yet appeared of the plans and purposes of the new Forest Products Laboratory at Madison, Wis. It was the coming opening of this institution that suggested the thought which is prominent in this number of *AMERICAN FORESTRY*—the prevention of waste—for it is that which is the reason for being of the new building and of the enlarged activities of the Branch of Products of the Forest Service, an enlargement which means much to the wood-using industries of this country.

The establishment of a completely equipped central station for testing and experimentation with the properties of wood gives such an opportunity as has not existed before to really know our wood resources "for all there is in them."

The institution of the new laboratory and of the corresponding statistical office in Chicago are further steps in the policy of dispersal of the activities of the Forest Service to bring them nearer to the people whom it serves. This will make the people better acquainted with the personnel and work of the service, from which knowledge will result, we believe, a greater understanding and better confidence. The first and greatest step in this direction was the establishment of the district offices in the national forest states, each with its district forester and full staff. This brings the workers nearer their work and nearer the people whom this work directly affects. The results have already approved the plan. There is increasing efficiency in the service and a much better feeling in the west for it.

Now comes the laboratory in Wisconsin and the office of utilization in Chicago. We are building up by degrees a great national forest administrative service which we have good reason to hope and expect will soon compare with any in the world.



The Forest Fire Season

THIS month we have given much space to the subject of waste and its prevention. Meanwhile dispatches in the newspapers from many sections of the country apprise us that forest fires, one of the most constant sources of preventable waste, are getting in their usual work and preparing the annual lesson which legislators are so unaccountably slow to learn.

And yet this legislative indifference is not so unaccountable when one thinks that it is only the natural reflection of the indifference of a large part of the community to a danger which the average citizen regards as remote and lacking in interest to him. It is a good piece of work for all of our forestry associations to educate the public to the general economic importance of this matter. That is the best way to break down legislative indifference.

The annual loss from forest fires cannot be put into figures. All attempts to reduce it to statistics have proved inadequate and unsatisfactory. Estimates of loss are seldom supported by sufficient knowledge and judgment on the part of the estimators, and the great damage to the future that may be done even by a ground fire that destroys little actually existent and available property is outside of statistical computation. We can see, however, without exact figures, the terrible results of the burns that not only destroy standing timber and all property in their path, but affect for years the productive capacity of the soil and set back often for a generation the young growth.

This is a form of waste that, if not absolutely preventable, can be reduced to an inappreciable minimum, and must be if our forestry work is to be made practicable. The cost will be no greater proportionally than that involved in the protection from fire of town and city property. Prevention is easier in the case of the forest, because man is the uncertain element in the fire problem, and the human conditions are much simpler in the forest than in populous communities.

Insurance of forest property can only be obtained at prohibitive rates under present conditions, and prudent men hesitate before entering upon long-term investments in property that is protected neither by insurance nor by adequate exercise of the state's police power. States and municipalities recognize their obligation to protect all other property from fire and other perils. The owner of a stand of timber who holds it in good condition certainly deserves as well of his community as the man who salts his property down in stocks and bonds. Furthermore, as a property owner and, under present laws, an inequitably burdened taxpayer, he has a right to claim protection.

In the May number of this magazine, Mr. Gaskill showed us how New Jersey is directing its forestry work at present solely against the fire evil, believing that other things will take

care of themselves if that is well attended to. This may be an extreme attitude, but there is much reason in it, and if the state can only handle properly one phase of the question, that is the one that demands first consideration.

We cannot expect much private forestry until we make forest property as reasonably secure as other property.



A Powerful Ally

IF WE may judge from the reports of and comments on the great meeting of the National Lumber Manufacturers' Association at New Orleans in April, that gathering was most significant in its serious consideration of the larger problems of lumbering and forestry. The purely commercial questions that have largely occupied our business associations of this kind seem to have been markedly subordinated. *The Southern Lumbermen* expresses this at the beginning of its report of the meeting when it says:

The striking feature of the eighth annual meeting of the National Lumber Manufacturers' Association held here at the Grunewald Hotel yesterday and to-day, was the fact that the excellent papers which composed the program and the general trend of discussion were not directly along the lines of a study of sales methods for the marketing of forest products, but rather for the conservation of timber and a complete utilization of all forest products. It might well have been mistaken for a conservation meeting, as that was the subject that was most discussed, and with it the discussion of timber land taxation, which is so closely allied to the subject of conservation. It was the sense of the body that the present system of taxation is in many respects deficient and unjust, and that some action should be taken leading toward a more equitable system of taxation.

The two addresses which seem to have aroused the most active interest were those by Forester Graves on private forestry, on which we commented last month, and by Professor Fairchild on the taxation of forest lands.

President Hines, in his annual address, emphasized the importance of forest conservation to the lumberman

and its national bearings, which make it primarily a matter for a national association to deal with rather than the local affiliated bodies. "One reason for this," he said, "is that under the present protective system practically every timber section is in more or less direct competition with every other section, and if costly restrictions and duties are placed upon the lumber manufacturers of one state, they are placed at an artificial disadvantage with their competitors in another state." In view of this fact, he announced the establishment by the board of governors of a conservation committee of the association, headed by Capt. J. B. White. "Under the guidance of the able chairman of this committee," President Hines promised, "the lumbermen of the country will be placed in their proper light in the front ranks with this new handling of conservation on enlightened and practical lines, and must be recognized by those theorists who profess to be the only conservationists." This declaration from such a source is assurance that the cause of forestry is at last coming to its own and perhaps the theorists have had something to do with bringing this about.

President Hines mentioned among the subjects for this committee the treatment of cut-over lands, requirements as to cutting, diameter limits of cutting, and replanting, remarking that in some states propositions have been seriously considered which are absolutely impractical. The following statement made by him is significant and shows a wise grasp of the situation:

Many lumbermen might like to have all these subjects dismissed, but it is my conviction that the conservation movement has gone so far that it cannot be stopped, but its direction can be controlled somewhat and practical ideas and methods can be insisted upon by us.

He also spoke briefly and forcibly of the tax question as one of the utmost importance. In this sentence he describes a fundamental difficulty in the tax situation, especially in some of our more conservative states: "One great trouble with the present method of tim-

ber land taxation is that most states make no distinction between the different classes of property, their value to the community, and the effect of taxes upon them. The timber owner cannot be a timber grower under present conditions." He announced the conclusion of the board of governors and the conservation committee that so far they found the best plan to be to levy the tax only when the timber was cut, when a full tax would be levied, but it would be so definite that it could be figured in estimates of cost. They believe that so long as the owner keeps land in growing timber there is no reason why he should be taxed. This, by the way, is the plan that is advocated by Professor Fairchild of Yale, who has studied this problem more thoroughly, perhaps, than any other economist or forester in this country.

All through the meeting ran this awakening interest in practical, working forestry, the kind that every sincere conservationist, whether theorist or not, wishes to see. It appeared in nearly all the reports and many suggestions were made looking to effective action. Unquestionably, our foresters and lumbermen are getting together and something is sure to be accomplished when forestry secures such support as that which a powerful organization like the National Lumber Manufacturers' Association can give it.



The Women's Clubs and the Forests

THE support of the women of America is a powerful aid to any cause. This is such a truism that it seems unnecessary to have uttered it, but it suggests some thoughts concerning the connection of the federated women's clubs of the United States with the forestry and conservation movements. These clubs have shown a splendid public spirit in taking up many of the great movements for national betterment. But there is much danger that this inclusiveness of interests will be attended with some vagueness of thought and action. We beg the women to guard against this, and to keep their thought on every subject they take up clear and direct, and their action posi-

tive and based on well matured judgment.

Forestry and conservation seem to make a special appeal to the women, and their clubs are laying increased emphasis upon this work. This is a fine thing for the movement. It means that this question will get into the homes of America and be brought to the children by the strongest influence they know. It is, we believe, especially necessary in these fields that clear thinking should be secured through sufficient knowledge. Much harm has been done in the course of the forestry movement, and the same is true of all branches of conservation, by immature thought arising from insufficient knowledge. To know whereof we speak must be our constant care. Now, if we may venture suggestion, the women's clubs sometimes undertake too much and gain only that little knowledge which is a dangerous thing, on subjects they take up. This produces mental dissipation in the individual which is unfortunate, but when it is applied to the advancement of a great public cause resting on a scientific foundation, it really becomes serious.

Therefore, we say to the clubwomen of America, your support is the most welcome that could come to our work, but in order that you may accomplish what you yourselves desire, be earnest, sincere, and thorough in every undertaking, and study these forest and conservation questions so that you can give sound reasons for the faith that is in you.

The great biennial meeting at Cincinnati showed clearly not only that the clubwomen are taking up forestry and conservation with the greatest enthusiasm, but that under wise leadership they are more and more developing thorough methods of action. Mrs. Gerard and Mrs. Brooks in the national committee, Mrs. Tucker in Massachusetts, Mrs. Mautner in Michigan, Mrs. Maury in Kentucky, Mrs. Avery in Louisiana, and many others who might be named, have given excellent examples of the right spirit and method, and through the influence of these women and others like them, we hope to see this work in the Federation brought to a high state of efficiency.

AS OTHERS SEE US

Translated from the *Revue des Eaux et Forêts*, February 15, 1910

THE recent dismissal of Mr. Gifford Pinchot from the Forest Service of the United States Department of Agriculture makes timely a reassuring word as to the high state of efficiency, stability, and encouraging prospects for the future which this able man has contributed to the government work in forestry and to the science in general in America. A statement of the actual results accomplished during the eleven years of Mr. Pinchot's service is a tribute to the ability of any man under the best of conditions, but no adequate description can be given of the tremendous prejudices and difficulties under which he worked and which his foresight and perseverance enabled him to conquer, nor of the tremendous revolution in popular thought, from reckless improvidence to conservative economy which his administration has brought about.

When Mr. Pinchot began his service as Chief of the Division of Forestry, he was "a forester without a forest." The government forest reserves, then comprising 42,000,000 acres, were practically unmanaged. Land laws designed to encourage settlement throughout the west made easy the fraudulent as well as the legitimate but wasteful exploitation of timber over great areas, while year after year fires ran through the poorly protected reserves, not gradually, but rapidly destroying their productive value. The duties of the Division, later the Bureau of Forestry, were purely advisory. Now, all this is changed, even to the name of the bureau. From a small division of thirteen men, not more than four of whom were technically trained foresters, the Forest Service has become an administrative force of over 2,000 men, with control over some 195,000,000 acres of land.

The "Forest Reserves," from which only dead timber could be cut, are now National Forests, which already yield nearly 400,000,000 board-feet of mature as well as dead timber per year, the cutting of which is done according to plans prepared by technically educated men. The employment of such men has led to the rapid growth of forest schools from two, at the time of Mr. Pinchot's accession to office, to twelve at the present time. This, together with the awakened interest of practically all the eastern and some of the western states in their own forest resources, has brought forward the subject of conservation as a great national issue.

The United States embraces so varied a range of climatic, topographic, and forest conditions that scientific experiments performed upon them cannot help but be of service to the cause of forestry almost throughout the northern hemisphere. Hitherto, America has come to Europe for her ideals, her examples, and to a large extent her methods of forest practice. Europe, on the other hand, has found in America some of her most beautiful and promising timber species. The work of Schwabach and Mayr, among others, brings out the fact that European foresters already take no small interest in American species. With the establishment of forest experiment stations brought about during Mr. Pinchot's term in office, the time is without doubt drawing near when the United States can supply to the world not only species but also technical information, based on thorough scientific experiment. The initiation of experimental methods, perhaps more than any other one feature, illustrates the great advance during recent years of forestry in America.

While Mr. Pinchot's departure is undoubtedly a loss to the Forest Service, the structure in the building of which he has been so largely responsible rests on too solid a foundation to be seriously disturbed. The need for a successor who should be above all a technical forester has become apparent. Prof. Henry Solon Graves, director of the Yale Forest School, has received the appointment to this position, and the nation may well be congratulated upon the choice. Professor Graves brings to the work the benefit of wide experience in forest practice in the United States,

supplemented by European study. He is thoroughly in sympathy with the system built up by Mr. Pinchot, with whom he has formerly served. Under his administration and with the increased appreciation of the necessity for forest conservation which has grown up, the future of forestry in the United States is assured. The technical problems in need of solution are many, but the impediments to their solution are now largely removed or in process of removal. Economics, not politics, will determine the future of American forestry.

CURRENT LITERATURE

REVIEWS

American Inland Waterways: Their relation to railway transportation and to the national welfare; their creation, restoration, and maintenance. By Herbert Quick. With eighty illustrations and a map, pp. xx, 241. New York and London: G. P. Putnam's Sons, 1909. Price, \$3.50

This handsomely typed and printed volume surprised the reviewer by its unflinching interest. The subject is treated with broad grasp and clear insight, not with any pet project in mind, but with a fine sense of proportion and of the inter-relation of various projects forming the whole of a true national conservation policy. From the first chapter on "The Grand Strategy of Trade" to the last on "The Battle of the Engineers," which brings the book almost up to the minute, the attention of the reader is held by the author's rapid, well integrated array of facts and arguments.

The strategic relation of waterways and trade, a comparison of the work done in Europe with our own arrested development on these lines, is the first point brought out, and it is made with great force, emphasized by effective facts and examples. In his chapter on "Bringing the Sea to the Farms," Mr. Quick shows the significance of waterway transportation to our rich agricultural interior, and treats especially the development of the Mississippi River system of waterways. In this connection he discusses quite frankly the problem of turning the waters of the Lakes Mississippiward. He recognizes the vastness of the Mississippi project, its diffi-

culty, and its cost, but he thinks this need not stagger us since the end to be attained is commensurate.

The historic competition between the railways and the waterways is the subject of an interesting chapter. The keynote to the argument on this phase of the subject is found in the following sentences: "And yet the railways should not desire the extinction of water-borne traffic. All over the world they have extinguished it so far as possible, but there is no basic reason for this antagonism. Of surface, shortsighted reason there is plenty. Waterways regulate and control rates on competing railways, but at the same time they powerfully promote the prosperity of the very roads with which they compete. Paradoxical as this may sound, to railway men especially, the transportation specialist (which the average railway man is not) knows that this is true, and understands the reason."

In discussing the need of new railway facilities to handle the business of the country, the author says we need from 75,000 to 120,000 miles of track, and so many new cars and engines that there is not enough iron in the country to meet these needs—and, he might have added, nor wood enough to tie the tracks.

There is a long and ably worked out chapter on the neglected subject of terminals, showing how much better this matter is handled abroad, and how our railways in their policy of suppressing water competition have closed the gates by monopolizing the water-fronts at strategic points. To quote again

one of the striking statements with which the book abounds: "There is good reason to contend that the federal government should insist upon an adjustment of the matter of terminals all along every such waterway before spending the people's money upon it; for a waterway with monopolized banks at the ports is a gift to the owners of the waterfront. The time to acquire rights for the public is before the highway is completed. To wait is, first to make a road for trade, and then pay for it over again to the owners of abutting land. The right of the railways to handle their terminal business to the destruction of waterway trade may well be considered; and, in a general way, the effects of terminals on water transportation should be worked out while there is yet time."

With his fifth chapter on "Rivers and the Conservation Movement," the author begins to link the waterways with the other problems of conservation and especially with forestry. In this and the following chapters he shows his breadth of view. He does not advocate simply a project or group of projects. The big national self-preservation and development problem is before him. He presents the case for Mr. Leighton's scheme of reservoirs for regulating streamflow, not as a lonesome scheme, but as an ally of mountain forests maintained for the same purpose; a part of a big system, as it really must be to be effective. The Southern Appalachian and White Mountain project appeals to Mr. Quick as one of the first needs for the waterways and the case is argued clearly and forcibly from this point of view. Here, again, is a statement that embodies a good deal of conservation philosophy: "The old scientists divided nature into the four elements of earth, air, fire, and water. We have seen how, in matters of coal consumption, forest destruction, power waste, flood damages, soil waste, and the like these four react on each other. We have begun to see that we cannot allow them to ravage the world unchecked. The time must come when he who cuts a tree must ask permission of the rest of the world, and he who burns coal must first prove that there is no way of doing the work by waterpower. A muddied stream, carrying off the richest of the soil, will be proof of crime in the community whence comes the silt; and all over the land will be found the reservoirs—small and great—from which in drought will flow the waters to make all our rivers navigable. In those days the 'blight of continental distances' will be removed. From Pembina on the north, Great Falls on the northwest, and Sackett's Harbor on the northeast, down to the Gulf, will run the new seaboard, and the same ships will ply the lakes in summer and carry cargoes to the tropics in winter. In a hundred streams now useless will run the regulated flow that will carry commerce, and, save in exceptional cases, every town in the land will have its waterway to the sea." Whether this dream can be fully real-

ized in all of its details or not, the principle in the author's mind is sound.

The closing chapter of the book, on "The Battle of the Engineers," reviews in an impartial way the discussion that has been in progress for some time, and with which our readers are quite familiar, on the effect of forests on streamflow. After a review of all the testimony, the author finds that perhaps the best summing up is contained in the comment of the Wisconsin lumbermen on Colonel Chittenden's noted paper: "Why, a man doesn't need any learning to know that forests protect the hills from washing and regulate the flow of streams. All he needs is common sense."

The appendix contains citations of value for reference. Finally, we should say that this is distinctly a popular book on a great subject, and a book that is worth while for the reader. Indeed, we do not know of any book that will give the non-technical reader so good a general view of the most vital points of conservation of natural resources in the United States, and of the big far-reaching principles underlying them, with, of course, especial emphasis on the waterways.



The Care of Trees in lawn, street, and park, with a list of trees and shrubs for decorative use. By Bernhard E. Fernow, Dean of the Faculty of Forestry, University of Toronto. Illustrated, pp. x, 392. New York: Henry Holt & Co., 1910. Price, \$2.00

This new book from Doctor Fernow's pen answers the description of a well-worn phrase in that it really fills a long-felt want. It is much of a surprise to see the author's name on a book of this character, but in his preface he shows that he, like others having to do with forestry work, has had to meet inquiries which showed an urgent demand for a comprehensive book of this kind. Not every one has anything to do directly and personally with forestry, but there are hosts of people concerned with the care of trees, yet with all the agitation concerning trees and all the interest in them which has been aroused in recent years, there has been nothing published comprehensive and practical in regard to the care of trees for shade and ornament based on scientific study. The nearest approaches to such a manual were a pamphlet monograph by the late Colonel Fox, superintendent of state forests of New York, and bulletin No. 125 of the Massachusetts Agricultural Experiment Station, issued by the station and the Massachusetts Forestry Association in cooperation about two years ago. The latter was called forth by a pressing local demand and a large edition was very promptly exhausted, but this publication was only a pamphlet and was adapted primarily to Massachusetts conditions, especially in its consideration of the shade-tree law.

Doctor Fernow's volume is a substantial one, comprehensive in substance and well illustrated. In his introductory chapter the author disclaims the presentation of new knowledge. His book, he says, is "mainly a compilation of the well-known facts which bear upon the subject." In his arrangement and inclusion of material, the author acts upon the belief "that a knowledge of the nature of trees is necessary to care for them properly." In view of Doctor Fernow's scientific habit of mind, we are not surprised to find him making a very important distinction which is often lost sight of: "The care of shade and ornamental trees is an entirely different matter from the care of forests. It is unfortunate that the distinction has not always been clearly perceived. The object of forestry is the substance of the tree; only when the tree is cut and its wood utilized, is the object of the forester attained; he grows trees, *not* to be preserved, but to be *harvested*. Hence, to call the tree-wardens of towns and cities 'foresters' is a misnomer. The tree that satisfies the forester is most unsatisfactory to the landscape gardener or street planter, and *vice versa*. The latter arboriculturists are after shade or beauty of form, hence their treatment of trees is entirely different from that of the forester, although, to secure the object in either case, the nature and life history of trees must be understood. On the other hand, no more fitting title, no better description of the duties of those who are set to care for our roadside trees or our city trees in street and park could be invented than that of 'tree warden,' a most expressive, dignified, and honorable designation."

In the second chapter the characteristic structure and life of trees are considered, the subject being presented in a simple, non-technical way. There are two chapters on diseases of trees. The first is a general discussion of old age, general causes of disease, fungus diseases, and damage by insects. The second is devoted to diagnosis of diseases, treating insect damage, fungus, and bacterial diseases, physiological diseases, effect of soil conditions, atmospherical influence, obnoxious gases, electric currents, light conditions, and mechanical injuries. The next chapter is an important one, covering the field of control of physiological diseases and treatment of mechanical injuries, and the general care of trees. Here are considered such topics as soil improvement, fertilizing, grading, pruning and trimming, manner of operation, callusing and repairing, treatment of street trees, care of aged trees, and quack medicines.

In connection with this last chapter, we note one omission. There are numerous cuts illustrating most of the types of tree tools, and there is a page of comment upon them—too little, perhaps, for a subject upon which

the amateur at least needs specific information. But this paragraph, although it has a heading, is not included in the synoptical contents, nor is a reference found in the index.

In the too brief paragraph on quack medicines we do not find mention of the proved fact, which Professor George E. Stone, of the Massachusetts Agricultural College, has discussed at length, of the injuries to trees from banding substances, nor does Doctor Fernow mention this. Doctor Stone has shown that several substances on the market for banding are distinctly injurious and should be avoided.

Chapter six deals with the control of parasites, that great army of fungus and insect enemies that preys in these days on nearly all of our most valued ornamental trees. This is a most important subject and is treated briefly, but perhaps as adequately as could be expected in a general work not devoted to this particular subject. There is a very valuable chapter on "Care in Planting Trees," a subject on which the author is quite at home. It is treated clearly and concisely. There is a short chapter on "Esthetic Forests, or Woodland Parks," an interesting field of discussion in which the forester, the landscape gardener, and the tree expert come together on a common ground in which the functions of each are not clearly separated. There are 126 pages devoted to the choice of plant material. This matter is very helpful. It consists of practical suggestions regarding the selection of the most desirable trees and shrubs and with this a list of trees and shrubs, with brief descriptions and notes. The author explains this chapter at its beginning by saying: "Although this book is not designed to be a guide in the laying out and planting of grounds, it seemed, nevertheless, germane and desirable to add a chapter on the selection of plant material, inasmuch as the after care is to some extent influenced by the original choice of trees." The list seems to be well selected, conveniently arranged, and contains in very concise form the most important information on the shade tree required by the planter and gardener. The book has quite an extensive index, although beyond the omission which has already been noted we have not examined it as to completeness. There is also a brief list of books on related subjects. This list contains twenty-six separate titles and a number of general books on landscape gardening, which are grouped together. Most of the titles are those of bulletins published by United States experiment stations, but there are a few larger and more complete volumes.

We are very glad that this book has been provided for the use of tree lovers. It was much needed, and it is very fortunate that an authority like Doctor Fernow could find opportunity to fill this need so satisfactorily.

MONTHLY LIST FOR MAY, 1910

(Books and periodicals indexed in the Library of the United States Forest Service)

NOTE.—A list of current literature will appear regularly in *American Forestry* in the future, as a continuation of the lists which have been issued monthly by the Forest Service since February, 1904.

Forestry as a whole

Proceedings of associations

University of Nebraska—Forest club. The forest club annual, vol. 2, 1910. 114 p., plates. Lincoln, Nebr., 1910.

Forest aesthetics

Street and park trees

Fernow, Bernhard E. The care of trees in lawn, street, and park, with a list of trees and shrubs for decorative use. 392 p., illus., plates. New York, Henry Holt & Co., 1910.

Hall, Harvey Monroe. Studies in ornamental trees and shrubs. 74 p., illus., plates. Berkeley, Cal., 1910. (University of California. Publications, botany, vol. 4, no. 1.)

New Jersey—Forest park reservation commission. The planting and care of shade trees. 82 p., illus., plates. Paterson, N. J., State printer, 1909.

Phillips, T. Glenn. City tree planting; the selection, planting, and care of trees along city thoroughfares. 26 p., illus. Detroit, 1910. (Detroit city plan and improvement commission. Report no. 1.)

Forest education

Cary, Austin. Outline for lectures on forestry. 12 p. Albany, 1910. (New York—Forest, fish and game commission. Bulletin 5.)

Arbor day

Kellogg, Alice M. How to celebrate Arbor Day in the schoolroom. 96 p. Philadelphia, Penn Publishing Co., 1907.

Forest schools

University of Minnesota forest school—Itasca summer school. Prospectus, 1910. 24 p., illus. Arago, Minn.

Forest legislation

Hirst, E. C. Forest laws of New Hampshire. 18 p. Concord, N. H., 1909. (New Hampshire—Forestry commission. Bulletin 1.)

Forest description

India—Madras presidency—Forest department. Reports on certain continental forests, by F. L. Cowley-Brown. 83 p., illus. Madras, 1908.

Thompson, H. N. Gold coast; report on forests. 238 p., illus., map. London: Wyman & Sons, 1910. (Colonial reports, miscellaneous, no. 66.)

Whitford, Harry Nichols. Studies in the vegetation of the Philippines: 1. The composition and volume of the dipterocarp forests of the Philippines. 27 p., plates. Manila, Bureau of science of the Philippine government, 1909.

Forest botany

Trees: classification and description

Graves, William Elliott. Studies in eucalyptus. 96 p., illus. St. Louis, Eucalyptus timber corporation, 1910.

Maiden, J. H. The forest flora of New South Wales, pt. 38. 22 p., illus. Sydney, N. S. W., Government printer, 1910.

Maury, Sarah Webb. Native trees of Kentucky; a handbook. 140 p., illus. Kentucky federation of women's clubs, 1910.

Rogers, Julia Ellen. Trees that every child should know; easy tree studies for all seasons of the year. 263 p., plates. New York, Doubleday, Page & Co., 1909.

Woods: classification and structure

Troup, R. S. Petwin or trincomali wood, *Berrya ammonilla*. 8 p., plate. Calcutta, 1910. (Indian—Forest department. Forest pamphlet no. 12.)

Silvics

Forest influences

Ashe, W. W. Special relations of forests to rivers in the United States. 21 p. Washington, Government printing office, 1909.

Ecology

Warming, Eugenius & Vahl, Martin. Ecology of plants; an introduction to the study of plant-communities. 422 p. Oxford, The Clarendon press, 1909.

Silviculture

Planting

Langdell, R. S. Forest nursery and reforestation work in Massachusetts. 36 p., plates. Boston, State forester's office, 1910.

Macoun, W. T. Culture des arbres forestiers en pépinière. 36 p. Ottawa, C. H. Parmlee, 1909.

- Morris, O. M. Tree culture. 35 p., illus. Stillwater, Okla., 1910. (Oklahoma—Agricultural experiment station. Bulletin 86.)

Forest protection

- Schenck, Carl Alwin. Forest protection; guide to lectures delivered at the Biltmore forest school. 159 p. Asheville, N. C., The inland press, 1909.

Insects

- Stebbing, E. P. The blue pine "polygraphus" bark-borer. 7 p., illus. Calcutta, 1910. (India—Forest department. Leaflet no. 5.)
Stebbing, E. P. The larger deodar bark-borer. 12 p., illus. Calcutta, 1909. (India—Forest department. Leaflet no. 4.)

Fire

- Hall, W. C. J. and O'Hara, B. L. Treatise on the protection of forests from fire. 31 p., plates. Quebec, Department of lands and forests, 1909.

Forest management

- Ashe, W. W. The farm forests of Virginia and recommendations for their improvement. 12 p. Richmond, Va., State board of agriculture, 1910.
Ashe, W. W. Forest conditions in Virginia and proposed measures for forest protection. 20 p. Richmond, Va., Superintendent of public printing, 1910. (Virginia—General assembly—House. Document no 5.)

Forest mensuration

- Baughman, H. R. A. Baughman's buyer and seller. 8th ed., 293 p. Indianapolis, Ind., The author, 1906.

Forest organization

- Caccia, A. M. F. Tables showing the progress in working plans in the provinces outside the Madras and Bombay presidencies up to the 31st December, 1908. 44 p. Calcutta, 1910. (India—Forest department. Forest pamphlet no. 9.)

Forest administration

- India—Andaman Islands—Forest department. Progress report of forest administration, 1908-9. 23 p. Calcutta, Superintendent government printing, 1910.
India—Baluchistan—Forest department. Progress report of forest administration in Baluchistan for 1908-9. 41 p. Calcutta, Superintendent government printing, 1909.
India—State board of forestry. Ninth annual report, 1909. 88 p., illus. Indianapolis, Ind., 1910.

- Massachusetts—State forester. Sixth annual report, 1909. 109 p., illus. Boston, Mass., 1910.

- New Jersey—Forest park reservation commission. Fifth annual report, 1909. 56 p., illus. Trenton, N. J., 1910.

- Orange River colony—Department of Agriculture—Forestry division. Fifth annual report, 1908-9. 56 p. Bloemfontein, 1909.

- Quebec—Department of lands and forests. Report for the twelve months ending 30th June, 1909. 202 p., plates. Quebec, 1910.

Forest economics

Statistics

- Alsace-Lorraine — Abteilung für finanzen, handel und domänen. Beiträge zur forststatistik von Elsass-Lothringen, heft 27, 1908. 124 p. Strassburg, 1910.

Forest utilization

- Beauverie, Jean. Les bois industriels. 420 p., illus. Paris, Octave Doin et fils, 1910.

Lumber industry

- National lumber manufacturers' credit corporation. Credit rating book, 13th volume, April, 1910. 102 p., maps. St. Louis, Mo., 1910.

Wood preservation

- Wood preservers' association. Proceedings of the 6th annual meeting, 1910. 168 p. Galesburg, Ill., 1910.

Auxiliary subjects

Conservation of natural resources

- Titworth, Frederick S. Notes on the legal aspects of the conservation problem. 20 p. Denver, Colorado scientific society, 1910.

Grazing

- Griffiths, David. A protected stock range in Arizona. 28 p., plates. Washington, 1910. (United States—Department of agriculture—Bureau of plant industry. Bulletin 177.)

Geology

- Hayes, C. W. Handbook for field geologists. 159 p., illus. New York, John Wiley & Sons, 1909.

Periodical articles

General

- Annals of the American academy, March, 1910—National forests as recreation grounds, by T. Cleveland, p. 241-7; For-

- estry policy of New York, by A. Cary, p. 248-51; Forestry policy of Pennsylvania, by J. T. Rothrock, p. 252-9; State forests in Michigan, by F. Roth, p. 260-5; Southern Appalachian park reserve as a national playground, by G. T. Surface, p. 401-8.
- Annals of botany, January, 1910—Transpiration and the ascent of water in trees under Australian conditions, by A. J. Ewart and B. Rees, p. 85-105.
- Country Life in America, April, 1910—Two rather neglected trees, by H. S. Adams, p. 758; How to destroy boring insects in shade trees, by J. J. Levison, p. 776; River driver of Quebec, by A. W. Dimock, p. 683-7.
- Gardeners' chronicle, February 12, 1910—The catalpas, by J. Clark, p. 100; Street trees, p. 101.
- Independent, March 31, 1910—Why east and west differ on the conservation problem, by L. M. Scott, p. 697-9.
- Minnesota horticulturist, April, 1910—Norway poplar as a lumber tree, by A. V. McNeil, p. 134-9.
- North American review, April, 1910—Other side of conservation, by G. L. Knapp, p. 465-81.
- Outlook, March 26, 1910—Water savers, by W. V. Woehlke, p. 659-67.
- Putnam's magazine, April, 1910—Reclaiming the Everglades, by S. M. Ball, p. 796-802.
- Review of reviews, April, 1910—The advance of forestry in the United States, by H. S. Graves, p. 461-6.
- Scientific American, February 26, 1910—The Cochin forest railway, p. 184-5.
- Scientific American supplement, March 26, 1910—The artificial silk industry; converting wood into silken fabric, by W. P. Dreaper, p. 194-5.
- Scientific American supplement, April 16, 1910—Alcohol from wood waste, by R. F. Ruttan, p. 242-3.
- Shield's magazine, April, 1910—The effect of deforestation on bird and fish life, by J. M. English, p. 209-11.
- Torrey, April, 1910—The eucalyptus trees of California, by J. Broadhurst, p. 84-9.
- United States monthly weather review, January, 1910—Work undertaken at the Fremont forest experiment station in climatology and forestry, by L. H. Dangerfield, p. 97-101.
- Western empire, April, 1910—Eucalyptus culture, p. 17-19.
- World's work, May, 1910—How planting trees saved Jutland, by W. Hovgaard, p. 12976-9.
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- American lumberman, April 2, 1910—A forest policy for the south Atlantic and gulf states, by T. P. Ivy, p. 47-8.
- American lumberman, April 9, 1910—Plans for fire protection for the woodlands of New Hampshire; timber land owners in convention, by W. T. Cox, and others, p. 48-50.
- American lumberman, April 16, 1910—The commercial side of lumbering, by V. H. Beckman, p. 40-1; Thirty-seventh annual statistical report; production and stock of nearly eight thousand mills, p. 50-98A.
- American lumberman, April 30, 1910—Forest fire prevention and control, by E. T. Allen, p. 43.
- Canada lumberman, March 15, 1910—The forester's value to the lumberman, by B. E. Fernow, p. 22-3; Melting wood, p. 27; Warping of wood; its prevention, by T. B. Kidner, p. 26-7.
- Canada lumberman, May 1, 1910—The evolution of modern sawmilling, by I. N. Kendall, p. 24; A uniform log rule for all Canada, by A. H. D. Ross, p. 25-6.
- Engineering magazine, March, 1910—Protection of submarine structures, by W. A. Jones, p. 876-82.
- Engineering magazine, April, 1910—Electrical distillation of turpentine, by O. Higman, p. 108-10.
- Engineering news, March 3, 1910—The relation of forests to streamflow, by W. W. Harts, p. 245; Forests and streamflow, by R. C. Beardsley, p. 255-6.
- Engineering news, March 24, 1910—The strength of treated timber, p. 333-4.
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- Hardwood record, May 10, 1910—Utilization of hardwoods; stairs, p. 24-5; A real forest school, p. 26.
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- National coopers' journal, April, 1910—Report of forestry committee of National coopers' association, p. 25-6.
- Pacific lumber trade journal, March, 1910—Plans and prospects of forest fire association, p. 33.
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- Paper trade journal, April 21, 1910—Pulp from rossing waste, by C. W. Roberts, p. 38.
- Paper trade journal, April 28, 1910—Conservation of water rights, by J. R. Garfield, p. 36; Forest conservation in Canada, by H. D. Van Sant, p. 54.
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EDUCATION

Harvard Students to Work in New Hampshire

Blue Mountain Forest Park, in Sullivan County, New Hampshire, has been made available for the Harvard School of Forestry. This is the famous Corbin property, where for years the finest buffalo herd in the United States was maintained. The tract, which covers about 30,000 acres, has for some years been under careful management by forestry methods and offers an excellent opportunity for practicing the rougher methods used in unorganized country.

Through the courtesy of the owners, the second-year students of forestry will go to the park this month for the first field work.

This is an important addition to the already admirable facilities for practical work of the Harvard Forest at Petersham.

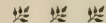


Forestry Education in Louisiana

Governor Sanders, in his message to the general assembly, urges that the law authorizing a chair of forestry in the state university be made effective. In view of the importance of its timber to the state and the rapid destruction which is going on, it seems none too early to begin the education of the students of the university in a science than which none is more important to the state's welfare.

University of Georgia Summer School

The summer camp of the School of Forestry of the University of Georgia will open June 20 and close August 20. It will be located in Alachua County, Florida, on a tract of 50,000 acres that has been placed at the disposal of the school by B. F. Williamson, of Gainesville. Lumbering and turpentine operations are in progress on the tract. Any student of the University of Georgia or any male person eighteen years of age who has sufficient education to profit by the courses may be admitted. The courses of study will include forest botany, silviculture, protection, measurements, lumbering, and utilization.



Michigan Agricultural College

All the junior students in forestry have appointments for the summer in the western national forests. It has been Professor Baker's plan to scatter the class over as large an area as possible in order that the maximum variety of conditions may be studied by members of the class. Each student will study the conditions that he meets with in his location and will make a report before the entire class upon its reassembling at the college next September. The students will receive \$75 per month, but the great advantage of the work will be the experience.



NATIONAL FOREST WORK

Forest Planting in the Semi-arid West

In the *Dry Farming Bulletin*, Smith Riley, district forester, makes the following report on planting experiments at Akron, Colo., and Bellefourche, S. Dak.: "The Forest Service is conducting planting experiments at dry farming experiment stations at Akron, Colo., and Bellefourche, S. Dak. The work at Akron is in cooperation with the Colorado Experiment Station and that at Bellefourche in cooperation with the Bureau of Plant Industry. While the agreements for this work were perfected in 1907, the actual work of planting did not begin until the spring of 1909.

"The object of the cooperative experiment work is to increase the knowledge concerning trees suitable for planting in the plains region of South Dakota, Colorado, and other similar localities, to test methods of spacing,

mixtures, and influence of cultivation on forest plantations; the ultimate purpose being to serve as an object-lesson to the settlers in methods of establishing windbreaks, shelterbelts, and woodlots, and the most desirable trees to use for each purpose.

"The provisions of the agreement in connection with this experimental work are that the Forest Service provides plant material and pays for labor necessary in preparing the land and planting the trees and for care and cultivation for a definite period after they are set out. The cooperator with the Forest Service is to furnish the land and the necessary supervision to carry out the plans of the experiment.

"Last spring 3,700 trees were planted at the Akron experiment station, and the following table indicates the species and the results obtained:

Table Showing the Result of Experiment Planting at the Akron Substation, Akron, Colo., 1909

Species	Class of stock	Number planted	Per cent alive	Growth past season	Length of growing season	Present condition
Honey Locust.....	18—24-inch seedlings	350	95	1 foot	4 months	Good
Green Ash.....	18—24-inch seedlings	500	88	$\frac{1}{2}$ foot	4 months	Good
Osage Orange.....	No. 1 seedlings	330	40	$\frac{3}{4}$ foot	4 months	Poor
Cottonwood.....	One year	85	50	4 feet	4 months	Good
Black Cherry.....	18—24-inch seedlings	165	40	2 feet	4 months	Good
White Elm.....	18—24-inch seedlings	825	92	2 feet	4 months	Good
White Ash.....	12—24-inch seedlings	330	77	$1\frac{1}{2}$ feet	4 months	Poor
Black Locust.....	One year	133	66	2 feet	4 months	Good
Russian Mulberry.....	24—48-inch seedlings	500	90	$1\frac{3}{4}$ feet	4 months	Good
Russian Wild Olive.....	12—24-inch seedlings	500	40	$1\frac{1}{2}$ feet	4 months	Good
Total.....		3,718				

"It will be noted from the foregoing table that with the exception of osage orange, cottonwood, black cherry, and Russian wild olive, the results were very satisfactory. The poor results of these species, however, are probably due to the bad condition of the stock when received from the nursery. The trees in this experiment were given as careful attention as any of the cultivated crops that were grown at the experiment station. The trees were given two shallow and three deep cultivations and were hoed twice during the season.

"This spring approximately 5,400 trees are to be planted in two windbreaks at the Akron experiment station. The trees to be used are the most common hardy varieties of broadleaf species and are honey locust, green ash, white elm, black locust, Russian mulberry, and hackberry. In addition to the windbreak planting, variety tests are to be made with seven different conifers in lots of 100 each, these species being European larch, Austrian, Scotch, jack, and yellow pines, Douglas fir, and Black Hills spruce.

"The cooperative planting at the Bellefourche Experiment station has not been planned as extensively as that at Akron. All the planting in connection with the dry farm work was done in the spring of 1909 when 3,400 trees were planted. The species, quantity of trees used, and the results obtained at the Bellefourche Station are indicated in the following table:

so as to form complete stand and test out thoroughly the development of the various species under these conditions.

"The experimental plots were given the very best of care and cultivated as thoroughly as any of the other crops grown at the station. It must be remembered that the season both at the Bellefourche and Akron stations was above the seasonal average, and this fact

Table Showing the Result of Experimental Planting at the Bellefourche Experiment Farm, Bellefourche, S. Dak.

Species	No. of plat	Class of stock	Number planted	Per cent alive	Avg.* height	Length of growing season	Present condition
Cottonwood	1	18—24-in. seedlings	258	71	42 in.	5 months	Very good
Cottonwood	2	18—24-in. seedlings	126	86	42 in.	5 months	Very good
Red Cedar	2	6—8-in. seedlings	126	46	12 in.	5 months	Poor
White Willow	3	24—36-in. rtd. cutting	354	99.9	36 in.	5 months	Very good
White Willow	4	24—36-in. rtd. cutting	189	99.4	36 in.	5 months	Very good
Rus. Golden	4	24—36-in. rtd. cutting	189	99.4	24 in.	5 months	Very good
Black Locust	5	12—18-in. seedlings	281	90	40 in.	5 months	Very good
Green Ash	6	18—24-in. seedlings	352	92	12 in.	5 months	Very good
Honey Locust	7	18—24-in. seedlings	235	85	15 in.	5 months	Good
White Elm	8	18—24-in. seedlings	105	98	18 in.	5 months	Very good
Siberian Pea Tree	9	12—24-in. seedlings	178	96	16 in.	5 months	Good
Russian Wild Olive	9	12—24-in. seedlings	178	93	24 in.	5 months	Very good
Black Hills Spruce	10	4—8-in. transplants	322	70	10 in.	5 months	Good
Australian Pine	11*						
Red Cedar	12	6—8-in. seedlings	405	61	12 in.	5 months	Poor
Scotch Pine	13	4—8-in. transplants	118	71	10 in.	5 months	Good
Total			3,416				

*The average height at end of growing season is less than height of stock at beginning, but is due to the fact that the trees were cut back severely at time of planting.

"It will be noted that the results are exceptionally good and are decidedly better than those obtained at Akron. The better results are probably due to the fact that the plant material was in better condition and perhaps handled more carefully after arriving. Ordinarily, the stand secured is sufficiently satisfactory to dispense with replanting of any of the plots, but it is the intention to replant

must be borne in mind when considering the results of the experiment. However, there is no doubt that tree growing can be made very successful under dry farm conditions if the land owner is led to fully realize that it is absolutely necessary to give the trees as much care as the most valuable crop on his farm."

Railroads to Cooperate in Fire Control

Secretary Wilson has signed a memorandum of agreement with the Great Northern Railway Company, and also one with the Northern Pacific Railway Company, which provides for cooperation of the Forest Service and the railroads to prevent damage to the national forests from fires along all lines operated by these railroads. These agreements had already been signed by R. I.

Farrington, vice-president of the Great Northern, and Howard Elliott, president of the Northern Pacific, so that they are, by the signature of the Secretary of Agriculture, now in force.

The agreements have in view both the reduction to the lowest point of the fire risk from the operation of the railroads and joint action by the Forest Service and the railroads to fight all fires which may start along the lines. The companies agree to clear and

keep clear of inflammable material a strip of varying width, as conditions may demand, up to 200 feet beyond the right of way, and to provide all locomotives which do not burn oil with suitable spark arresters and other standard equipment to prevent the dropping of fire. It is also stipulated that every effort will be made by the companies to operate their locomotives so as not to cause fires. The protective strip is to be designated jointly by representatives of the railroad and the Forest Service.

In fighting fires the railroads and the Forest Service will cooperate closely. Prompt notification to forest officers of all fires discovered by employees of the railroads is provided for. Telephone lines to make this possible will be put up by the Forest Service, using the companies' poles where this is desirable. Warning whistles will be sounded by locomotives on occasion. Forces of fire fighters will be assembled on the outbreak of fires, made up of forest officers, railroad employees, and such temporary labor as can be gathered by either. Except for salaries of regular employees, the cost of fighting fires which start within 200 feet of the railroads will be borne by the companies and of all others by the Forest Service, unless it shall be shown in the first case that the railroads were not responsible or in the second case that they were responsible for the outbreak of the fire.

The agreement provides that the Forest Service will regularly patrol the rights of way during the fire season. The work of clearing the strips satisfactorily, including disposal of all slash and refuse, is to be performed by the railroads under the supervision of the Forest Service.



Grazing Lands in the National Forests

Some of the senators from the Rocky Mountain states frequently and emphatically assert that the people in their states are hostile to the inclusion of so much of the national domain in national forests and represent that this destroys the development of the country and interferes with the rights and opportunities of individuals. Grazing is one of the industries which they assert is seriously injured by a national forest policy. That this is not true is clearly shown by the fact that so many protests have been received by the United States Department of Agriculture against the elimination from national forests of non-timbered lands that are chiefly valuable for grazing, that Secretary Wilson has found it necessary to make a statement in regard to this question, explaining that the department acts under certain limitations in carrying out the intent of existing laws. "Most of the protests," he said, "set forth injuries which may result from unregulated grazing on the land to be eliminated."

We have an example of this in a copy of a petition which was sent some time ago to a western senator by some of his constituents asking that the boundaries of one of the national forests in the northwest be enlarged to include a certain specified area. This petition was signed by a number of ranchmen, most of them small owners. It is the small owners who benefit by the grazing regulations of the national forest and are protected against the oppression of the large ranchmen who gather in the opportunities which are not protected by these regulations.

The department further explains that the lands proposed to be eliminated are neither forested now nor regarded as suitable for the future growing of trees, so that the government has no authority to hold them as part of the national forests, their actual character having been determined.

The policy recently agreed upon by the Secretary of Agriculture and the Secretary of the Interior, and approved by the President, is not an innovation, but is the same policy which has always been applied by the Forest Service in deciding where national boundaries should be drawn. The reason why lands formerly included in national forests are now being eliminated is to be found not in a change of policy, but in the fact that the actual conditions were ascertained last year for the first time through careful boundary examinations.

The evils feared by those who are now making protest against the exclusion of the lands in question are usually of two kinds. In many places, residents find themselves likely to suffer from an invasion of the range by outsiders. If the grazing is uncontrolled, transient stock may not only eat up the forage, but also deplete the range through overgrazing, to the loss and even the eventual ruin of the local stock owners. Although Secretary Wilson recognizes that this may be the case, he has pointed out to those who make this argument that government control of lands valuable only for grazing was not contemplated by the laws authorizing the creation of national forests, except as far as is necessary to secure practical administrative boundaries.

Another ground of protest against the eliminations is that administration by the Department of Agriculture has already resulted in great improvement to the water-flow, or that unregulated grazing will result in polluted streams or serious damage to watersheds. In some cases the increase in water supply which has followed national forest administration is put as high as twenty-five per cent. To those who make this point, Secretary Wilson is replying that every effort has been made to safeguard water supplies; that the eliminations proposed are only along the borders of the forests, and the protection of water-flow is recognized as a legitimate reason for retaining brushland even though it is not likely

is not denied that in some cases the elimination of purely grazing lands may possibly result in a certain amount of stream pollution, but the Department of Agriculture holds it has no authority to try to prevent this

ever to grow timber of commercial value. It through national forest administration of such lands. In the main, it is believed that the interests of water-users have been well cared for in making the eliminations.

STATE WORK

CALIFORNIA

A Plan for State Forests to Protect Irrigation

The orange growers of southern California are becoming alarmed at the rapid destruction of timber, because the cutting away of the timber endangers the water supply. State Forester Homans, in consultation with fruit growers of Orange, Riverside, and San Diego counties, has developed a plan by which the legislature may be asked to appropriate half of the money necessary to buy the forests surrounding the irrigated fruit lands, and the growers furnish the rest, with the understanding that the forests be taken over by the state and maintained as public reserves. Under that plan the state would be getting more than an equitable return for its money, and the land owners would be remunerated through benefits derived by the preservation of water for irrigation.

"Another plan," says Mr. Homans, "is for the fruit growers to buy the timber lands outright and keep them as private property. Also, the legislature could pass a law to stop the cutting of the timber. But the plan which seems to me the most logical one is for the state and the fruit growers to each appropriate enough money to buy the necessary forests and deed them to the state."



Connecticut

The state forester, S. N. Spring, has issued an urgent statement calling attention to the forest fire peril and asking for the cooperation of all citizens in guarding against it.

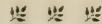
Reports for 1909 from ninety-four per cent of the towns in the state show the following totals: Three hundred and thirty-six fires burned over 15,000 acres, with an estimated damage of \$27,000. The expense of fighting these fires was approximately \$2,500, of which the towns paid one-half. Six per cent of the towns did not report at all, and it is probable that many other fires occurred which were unreported.

The reports of damage done were also very low, since the loss to future growth and the final crop is difficult to estimate, although very great. The damage was probably at

least a third greater than reported, a total of \$36,000. Many of the fires, through the efforts of the wardens, were confined to small areas, and it is evident that the loss would have been much greater if there had been no organized effort to control and prevent fires.

Of the 336 fires reported, no known cause for nearly one-half, or 159, was given. In many cases it is difficult to determine with certainty how the fire started, especially as the warden's attention must necessarily be directed to putting out a fire in its early stages if possible. Ninety-four fires were attributed to sparks from locomotives, and eighty-three to carelessness of hunters, campers, brush-burners, etc. Doubtless there were many unreported railroad fires, which were put out by section hands and wardens before much damage was done. The fact remains that the railroads are responsible for an unnecessarily large number of forest fires. Greater cooperation of the railroads with forest fire wardens must be secured during the coming season.

In his statement, Mr. Spring summarizes the forest fire laws of the state, and discusses the causes of fires and means of prevention.



Forest Legislation in Maryland

The Maryland legislature has recently enacted into law some recommendations of the state forester amending the present forest laws. The most important features are giving forest wardens the power of arrest without warrant in the case of any violation of the forest laws, the power to summon assistance, and to require the use of teams, tools, etc., in extinguishing forest fires. The new law makes it the duty of any one who sees a forest fire not under control to extinguish it, or to report it to the local forest warden. Failure to discharge this duty is punishable by a fine of \$10.

The apportionment of forest wardens shall not exceed one warden for each 15,000 acres of woodland determined by the survey of the state board of forestry, each warden to be commissioned by the governor on recommendation of the state forester. The mini-

munum pay for wardens has been fixed at \$1.50 for five hours or less and 25 cents per hour thereafter, and the pay of those employed to assist shall be at the rate of \$1 for five hours or less, and 20 cents per hour thereafter. Expenses on account of forest fires are to be borne half by the state and half by the county in which the fires occur. In addition to payment for fire fighting, each warden may receive a salary of \$20 per annum from the forest reserve fund.



Massachusetts

The Massachusetts method of acquiring state forests and at the same time promoting private forestry by taking over through purchase or gift comparatively small tracts of land for reforestation with the privilege secured by law to the owner of repurchasing the property in ten years, paying a moderate percentage to cover the cost of the work of planting and care by the state in the meantime, is progressing slowly but surely. Massachusetts forestry figures look small as compared with those of states of larger area and more scattered population, but it must be remembered that forestry, so far as this state is concerned, will always be intensive. At present nearly 2,000 acres have been taken by the state under this law and are being planted under the direction of the state forester, F. W. Rane. White pine and Norway spruce are very largely used for this purpose. About 500,000 pine seedlings have been imported, and about 1,000,000 pines and Norway spruce have been grown in the nurseries of the state forest service at Amherst and East Sandwich. The tracts included in these 2,000 acres are distributed among about twenty towns in different parts of the state. A large part of the tracts has been turned over to the state without cost. If the former owner does not choose to resume his property at the end of the ten years by paying the required amount to the state, it will become the permanent property of the commonwealth.

The Massachusetts legislature has disposed of most of the tree and forest legislation that was before it at this year's session. An act was passed to lessen the danger of forest fires in the case of Plymouth and Barnstable by prohibiting aliens from entering upon any land in those counties for the purpose of picking flowers or berries or for camping, without first obtaining the written consent of the owner. The pineries in these Cape Cod counties have been subject to continual fires of considerable extent and destructiveness, and this act seeks to diminish one of the frequent causes of these fires.

The town shade tree law of Massachusetts has for many years been the most effective law of the kind in force in any state in the

Union, and by an act of the present legislature the provisions of this law are extended to the cities of the state. Another act called forth by prevalent conditions in the state requires any one wishing to cut a tree near the highway limits to prove that such tree is not within the highway. In the country towns of the state it has heretofore been very difficult to determine whether trees in woodlots bordering a highway were within the highway limits, and therefore under public control or not. This was owing to the fact that most of the country roads are ancient layouts that have not been accurately surveyed.

At the request of the state forester, a law was enacted prohibiting the sending up of fire-balloons of any description and providing a heavy penalty for violation. This was prompted by the fact that forest fires have been traced to the use of these balloons.

A law was also enacted empowering the state forester, with the approval of the governor and counsel, to accept bequests or gifts of land or money on behalf of the state to be used for the purpose of advancing forestry interests.

Another law provided that towns of a valuation of \$1,500,000 or less appropriating money for defense against forest fires will receive in addition from the state an equal amount up to a limit of \$250.

The Massachusetts Forestry Association, after publishing, under the name of *Woodland and Roadside*, a small periodical for eight years, has decided to discontinue it, and the last number was published in May. This bulletin has served a very useful purpose, but the officers of the association believe that the work of the association has now reached such a stage that its purpose can best be carried out by the issuance of special bulletins and circulars from time to time without any regular publication. This makes it eminently desirable that the members of the Massachusetts Forestry Association and others who have received *Woodland and Roadside* in the past should become subscribers for AMERICAN FORESTRY and thereby be able to keep regularly in touch with the progress of the forest movement.



New Hampshire

As a result of the meeting recently held by the New Hampshire Forestry Commission, it is announced by E. C. Hirst, state forester, the large timberland owners of the northern part of the state have subscribed enough to put in operation during the danger season a practicable system of fire protection. The commission has located three stations—on Mount Kearsarge in Conway, Mount Washington, and Mount Rosebrook—but these are inadequate to cover the north

country and the funds provided by the legislature would not do any more, so the plan of cooperation with large owners was adopted.

The system used will be that which has proved effective in Maine and New York. Mountaintops will be used as lookout stations and telephone lines built, so that a man on the lookout may notify a firewarden or the nearest inhabitant as soon as a fire is discovered. Lookout men will be kept on duty at all times when there is danger of fires, and if enough financial support is secured patrols will be started along the most frequented trails and camp sites during times of drought.

The mountains to be used as lookouts are Mount Pisgah, overlooking the Connecticut lake region and the Magalloway Basin; Dixville Peak, near "The Balsams;" Signal Mountain in Millsfield, Percy Peaks in Stratford, Bald Cap in Success, Mount Agassiz in Bethlehem, Mount Bond in Lincoln, Mount Moosilauke, Mount Chocorua, and Mount Carrigan. These, with the lookouts on Mount Rosebrook, near the Mount Pleasant Hotel; Mount Kearsarge, and Mount Washington, will bring the number up to fourteen.

Lookout men are already at work on several of these mountains, and construction work is being rapidly pushed on others. It is estimated that six more lookouts would cover the mountain region of the state very thoroughly, and these will be built as soon as contributions are made.



NEW YORK

Pettis Succeeds Cary

The resignation is announced of Austin Cary as superintendent of state forests of New York. Clifford R. Pettis, state forester, has been appointed to succeed Mr. Cary. The latter was appointed less than a year ago to succeed the late Col. William F. Fox, who had been superintendent since the creation of the office. Mr. Cary resigned because of ill health, which seriously interfered with his work.

The *Albany Argus* says that there has been some criticism of Mr. Cary's administration, on the ground that he is too much of a theorist. The critics must have been misled by the title of professor, acquired by Mr. Cary in the Harvard University forestry department, for the most of his professional career has been spent in the woods in the service of great lumber companies, and he is one of the most experienced practical foresters in America and a man of good judgment and sound sense.

Mr. Pettis lives at Clear Lake Junction, in the Adirondacks country, and is an experienced forester. He served eight years under Colonel Fox and has been very successful in his management of the state nurseries.

PENNSYLVANIA

Another Instance of Private Forestry

As a practical example in private forestry, Lewis K. Stubbs, who owns a fine farm in southern Lancaster County, Pennsylvania, in the beautiful hill land bordering the Susquehanna River, has just finished planting 3,000 red oak seedlings, writes W. F. McSparran, in the *Tribune Farmer*.

Mr. Warfield, of the state forestry department, superintended and directed the planting, which was done on a rather steep and rocky hillside that had been for many years past devoted to pasture and is well set in native wild grasses, more valuable for soil enrichment than animal nutrition.

The method of planting the seedlings was to dig a small hole with a mattock, and, placing the tree root against the solid side of the hole, draw in the soil and ram tightly against the tree. The holes were dug from six by six to four by five feet, endeavor being made to maintain general straight rows, but no time being lost in alignment, the general object being to demonstrate that reforestation can be done cheaply and rapidly.

Mr. Stubbs had the seedlings shipped from a middle-west nursery. They cost him about \$6 a thousand, and he hopes to prove by this initial planting that he can thus materially improve the value of a not very productive hillside. He hopes, also, to stimulate a local interest in tree planting for the private land owner who may have hillside or other lands that may be more desirable for profitable tree growing than for cultivation in farm crops.



Forest Taxation in Wisconsin

The United States Forest Service is making a cooperative study, with the Wisconsin State Board of Forestry, of forest taxation in that state. The plan of the study is outlined as follows:

The purpose of this investigation is to obtain the information from which conclusions may be drawn as to whether or not the present method of taxing forests is satisfactory or not; and, if not, what the evil features are, and how the taxation of forests may be placed on a satisfactory basis. For this purpose information is required upon the following topics:

1. *The actual burden of taxation on forests*, at the present time, and also in the past so far as possible. Also whether forests are taxed more or less heavily than agricultural and other lands. For this purpose it is necessary to ascertain:

1. The total valuation of all property, real and personal, in each town and county of the state; the assessed valuations and true values, so far as possible, of forests, waste

lands, and, for the sake of comparison, of agricultural lands, in the several parts of the state. Also the prevailing ratio of assessed valuation to true value. Also the tax rates for every town and county of the state.

2. Detailed facts about as many particular cases as possible where the relation between assessed and true value and the actual burden of taxation can be accurately determined.

3. Impressions and opinions of all persons, officials, timber owners, and others who are able to speak with authority.

II. *The administration of the general property tax in the case of forests.* The method of assessing forests. How does it compare with the assessment of agricultural lands, etc.? Is the law strictly or laxly enforced? Is enforcement becoming more or less strict?

III. *The importance of the revenue derived from taxes on forests.* How large a part of the revenue of each town and county comes from taxes on timberlands? For this purpose we should know the assessed value of forests in each town and county. Assessed value of waste lands should also be determined if possible. This question will undoubtedly be hard to answer; in many cases it will be impossible to get the information required. However, anything that can be obtained along this line will be of great value.

IV. *The effects of taxation on forests; on the management of forest properties; on the cutting of timber; on the use of cut-over*

lands, etc. Has taxation hastened cutting? Has it led to wasteful cutting or "skinning?" Has it led to abandonment of cut-over lands? Has it prevented reforestation of cut-over lands or the practice of conservative lumbering, etc.? What has happened in the past? What is the present condition? Are there any indications of probable future effects?

V. *The general attitude of people toward the subject:*

1. Is there discontent and complaint of excessive taxation of forests? Is there complaint that forests do not bear their fair share of taxes? Or is there general satisfaction with the taxation of forests? Or is the subject not considered of importance?

2. Are plans of reform being discussed? If so, what; and by what arguments are they supported and opposed?

3. Information is especially desired as to (1) how the plan of a single tax on yield when cut would be received, and (2) how people would regard the plan to separate trees and lands, taxing the former on the yield, and taxing the latter annually on its value as waste land or bare land, or at the lowest value at which any land is assessed in the district.

VII. *For aid in answering all of the above questions,* general information is needed as to the amount and character of forests and of waste lands in different parts of the state, the ownership of such lands, and the uses being made of them.

LUMBERMEN AND LUMBER JOURNALS

National Slack Cooperae Association

The National Slack Cooperae Association met in Cincinnati the 17th and 18th of May. William L. Hall, assistant forester of the United States Forest Service, was the principal speaker on the closing day. The following officers were elected: President, George T. Pettibone, Louisiana, Mo.; vice-president, A. B. Struthers, Romeo, Mich.; secretary and treasurer, J. S. Palmer, Sebewing, Mich.; directors, James Innes, Chatham, Ont.; W. K. Jackson, Buffalo, N. Y.; J. T. Wylie, Saginaw, Mich.; R. Mittelbuscher, Davenport, Iowa; C. E. Chittenden, Ashley, Mich., and N. V. Turner, Malden, Mo. Chicago was chosen for the next convention, on the second Tuesday and Wednesday of November. Among resolutions adopted was the following:

"We believe that the nation should exercise its constitutional power for the general welfare in disposing and regulating the public domain; that no license or grant of water-power or power sites should be made which

does not safeguard the public interests by requirement of reasonable prompt development on pain of forfeiture; payment of a fair compensation periodically adjusted; the limitation of the grant to a term of fifty years; the right of the government to make reasonable regulations as to rates of service, and the provision for inspection and publicity of records and accounts.

"That the government should retain title to all lands still in public ownership which contain phosphate rock, coal, oil, or natural gas, and that the development of same should be made under the same conditions and regulations as will prevent extortion and waste.

"That the nation and several states should enact effective laws to prevent the spreading of fire in all forests, whether publicly or privately owned.

"That the conservation of our natural resources is of such great importance that the subject should at all times engage the attention of the nation, the states, and the people in earnest cooperation, in order that the foundations of our prosperity may be conserved."

The Endowment Completed

At the recent meeting of the National Lumber Manufacturers' Association, the endowment of the chair of lumbering at the Yale Forest School, undertaken five years ago, was completed. Mr. Rhodes reported that \$66,246.20 had been paid in, and that the Weyerhaeuser interests had pledged \$10,000 if the balance was raised among the lumbermen of the country. The yellow pine manufacturers pledged \$10,000, and before the close of the meeting the balance was secured, making the amount slightly in excess of the required \$100,000. It was reported that Mrs. Sage and Andrew Carnegie would each give \$100,000 if the lumbermen raised their amount.

The following officers of the association were elected: President, Edward Hines, of Chicago; vice-presidents, Everett Griggs, of Tacoma, Wash.; William Stillwell, Savannah, Ga.; R. H. Downman, New Orleans, La.; R. H. Vansant, Ashland, Ky.; secretary, George K. Smith, St. Louis, Mo.; treasurer, J. A. Freeman, St. Louis, Mo.; manager, Leonard Bronson, Chicago, Ill.; board of governors, William Irvine, W. C. Langdon, F. H. Pardoe, J. B. White, E. C. Fosburgh, F. E. Weyman, R. M. Carrier, W. C. Meyers, J. H. Bloedell, A. T. Gerrans, William Dreary, Lloyd J. Wentworth, C. A. Bigelow.

The association includes the following affiliated organizations:

Association	Membership	Output, 1909
Southern Cypress Manufacturers' Association.....	52	445,000,000
Michigan Hardwood Manufacturers' Association.....	70	319,000,000
North Carolina Pine Association.....	71	664,000,000
Wisconsin Hardwood Manufacturers' Association.....	36	100,000,000
No. Hem. and Hardwood Manufacturers' Association.....	60	550,000,000
Western Pine Manufacturers' Association.....	84	874,000,000
Northern Pine Manufacturers' Association.....	50	1,419,000,000
Southwest Washington Manufacturers' Association.....	28	200,000,000
Pacific Coast Lumber Manufacturers' Association.....	105	3,000,000,000
Yellow Pine Manufacturers' Association.....	275	3,649,000,000
Oregon and Washington Lumber Manufacturers' Association.....	105	800,000,000
Hardwood Manufacturers' Association of United States.....	272	600,000,000
Georgia-Florida Sawmill Association.....	76	800,000,000
	<hr/> 1,344	<hr/> 13,420,000,000

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Practical Reforestation Work

The *Paper Trade Journal* gives this account of the practical reforestation work of the West Virginia Pulp and Paper Company: "The company owns practically the entire Cheat Mountain Valley, near Cass, W. Va., the holdings starting at the sources of the river and continuing down the main stream a distance of probably thirty-five miles, an aggregate of about 100,000 acres of virgin spruce forest. The spruce of that section is of exceptionally fine quality and the stand is very heavy. S. E. Slaymaker, of New York city, who is at the head of the lumber department, is an altruistic man. His conscience bothers him when he thinks about the havoc his several hundred woodsmen make in the forest every year, and it has been troubling him so greatly that he has devised a practical scheme for replacing the timber. This tract was examined by experts of the government several years ago, and a plan was suggested for replanting with small trees to be shipped in from a distance. Instead of following this plan, those in charge of the work devised one of their own. In certain valleys conditions are ideal for the propagation of an overabundant growth. The surplus plants are taken out of the ground in the afternoon and are replanted the next morning. The company has set out 25,000 spruce

trees during 1909, of which eighty per cent are said to be thriving, and this spring the company has planted 169,000 spruce trees, also 10,000 to 12,000 young poplars, and expects to put in about 60,000 additional, and hereafter at the rate of about 100,000 trees a year. Another practical feature of the operation at that point is the precaution taken to prevent the inception and spread of fire. A space of fifty to 100 feet is cleared along every logging road and spur. During the dry seasons every locomotive is followed by a ranger, who stamps out small leaf-fires which originate in its wake. During the ten years in which this company has operated only a little more than 1,000 acres have been burned over, and this was cut-over land. The officers of the company deem it just as important to keep the fire out of cut-over land as out of timber, and are guarding the preserves in such a manner as to insure practically a continuous supply of saw logs and pulp wood.

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Minnesota Lumber

Lumbermen estimate that of the 1,000,000,000 feet of Norway and white pine cut in northern Minnesota last winter, at least twenty-five per cent and possibly thirty-five per cent, is still in the woods and cannot be

moved until next winter. This twenty-five per cent to thirty-five per cent represents approximately the profit margin of the winter's cut, and the impossibility of getting it to the mills may affect prices, though competition from the west and south, which is growing stronger, may make it unavoidable for the Minnesota lumbermen to ask more for their product. As the result of this tie-up in the woods, many of the sawmills of the state, especially those on the lower Mississippi, will be unable to operate, and sawmill labor will be cheapened for such mills as are able to run on full or part time. Several of the larger mills in Minneapolis which usually begin sawing about May 1, will not open until June 1, and will run only on half time from that. The Minnesota lumbermen are in a peculiar position in the market. The overproduction of yellow pine in the south is seeking a market in the north; the west stands ready to flood Minnesota markets with high-grade Washington and Oregon fir—more than enough to meet any deficiency in the home market. The season's cut of Norway and white pine will bring almost any price that the lumbermen care to ask, but at the present time they want to discourage rather than encourage competition. In this cement plays an important part. Lumbermen are noting with more or less alarm the advance that cement is making as a cheap and efficient substitute for pine, and they realize that a raise in prices now will give the cement manufacturers an advantage which it would later be hard to overcome.—*Pioneer Western Lumberman.*



The Question of Coercion

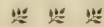
The recent decision of the United States supreme court in the Mississippi association case has a far-reaching significance. It marks the passing of the idea of coercion. That policy was long since abandoned by practically all lumber associations as ineffective. Years ago many of the associations by force sought to prevent competition, to control prices, or to regulate the trade.

Retail associations found that to boycott manufacturers or wholesalers was a difficult and even dangerous undertaking, and most of them long since contented themselves with promulgating the facts, leaving sales to consumers by the wholesaler and manufacturer a matter of conscience and policy. Manufacturers have learned the futility of agreements, "gentlemanly" or otherwise. More conservative ideas have been indorsed and these more effectually than any court decision have put an end to attempts at coercion.

In the affairs of the Mississippi-Louisiana association the court decision will have an important effect. In the affairs of most of the other associations it will have no effect at all, because such a decision long had been anticipated by most of them.

It is always a question in the minds of many association men whether coercion can be permanently successful. Such men believe that the most an association can do is to establish a principle and leave it to the individual to follow his own judgment.

The conviction is growing in all departments of trade that more is accomplished by the "get-together" spirit than by alignment in battle array. Men are endeavoring to enforce their rights by logic rather than by coercion. They are endeavoring to secure their rights by education rather than by recourse to force. Experience has demonstrated that the man or the association that goes about with a chip on the shoulder and looking for trouble produces bitterness and disputes that make the settlement of mooted questions more difficult instead of more easy. The days of passion are passed. The time of cooperation, arbitration, and calm consideration of disputed rights has come in its stead. It may be that the man who deliberately disregards the rights of others may not yield to persuasion or logic; but, if he is thus set in his ways, there is no reason to suppose that he can be forced to be good. He is an extreme type, no matter on which side of the controversy he is aligned. A larger class are those who commit error rather than wrong. This larger class may be antagonized by force. It can be converted by reason.—*American Lumberman.*



Utilizing Hardwood Timber

Manufacturers of southern hardwoods might well take a leaf from the experience of northern pine operators. At some of the largest and most modern plants in Wisconsin and Minnesota a system of economy is employed that goes far toward proving that practical conservation comes from utilization. Dead and down timber and short top logs are sent to the mill. These are thrown on to the carriage, split, and transferred to horizontal band resaws. There they are sliced into boards, passed to the edger, thence to the trimmer, and out into the yard. At some points the mills are turning out sizes ranging from one by three, two feet long, to heavy timbers.

If an attempt were made to apply this system to southern hardwood plants, the first step would be in the woods. How many manufacturers have ridden through their cut-over lands and found in the top of a tree a clear piece of timber anywhere from three to ten feet long, or found that the loggers left a good stick four to six feet long rather than cut an unusually long-length log?

Those portions of southern hardwood timber growing between clumps of limbs usually are absolutely sound and free from defect. Many trees fork after the first limbs are reached, and on some of the forks can be found a stretch of trunk eight to sixteen

inches in diameter absolutely free from visible defect. Would it not pay to make an effort to utilize such stock?

Such blocks or logs are well adapted to the manufacture of dimension stock. They could be split on the main saw and transferred to a resaw, then run through the edgers or, if deemed advisable, transferred to the department where dimension stock is cut. This should make it possible to utilize the product closely and to produce high-grade dimension without interfering with the usual cut of the mill. It would require only a few seconds for the bandsaw to split a block or log and the halves could be handled with great dispatch in the resaw. Of course, if an upright resaw be used, it would be advisable to slab both sides of the log.

The only question involved is whether or not it would be profitable to develop this phase of the hardwood trade of the South. The field is practically illimitable. In addition to oak dimension, shooks could be cut from cotton-wood and red gum blocks, handles and small dimension stock from ash and hickory, table and chair dimension stock from oak, washing machines and similar material from cypress, and like classes of material from other kinds of wood.

So far as the *American Lumberman* is aware, the idea never has been applied, but it would seem possible to do so with excellent results, increase the productivity of the timber owned, prolong the life of the mill, and swell the income greatly.—*American Lumberman*.

NEWS AND NOTES

CANADIAN CONDITIONS

Consul Van Sant Gives Some Facts in Regard to Lumbering and Forestry

Referring to recent discussions of Canadian forestry and to the attention that is being directed to the subject by our neighbors across the border, Howard D. Van Sant, United States consul at Kingston, Ontario, is quoted as making the following interesting statement in regard to Canadian forest resources:

"The area of the merchantable forests of Canada has been very much overestimated. Estimates of the forest area vary from 200,000,000 to 600,000,000 acres, the timber belt stretching from Ungava across northern Quebec and Ontario, and thence north of the prairies to the Peace River country, but the larger portion of this is not merchantable except for firewood, and cannot be transported long distances. The area of merchantable timber is estimated by some authorities at 100,000,000 acres. The secretary of the Forestry association stated that the amount of Canada's merchantable timber was one-third that of the United States, a liberal estimate placing the available supply at 532,000,000,000 feet board-measure. A recent Ontario estimate was to the effect that the timber, used at the present rate, will last the province thirty years.

"In Ontario the last annual return of revenue was \$2,082,878. The only reason given that Ontario has not had to resort to direct taxation is because the revenue of her crown lands has been sufficient to meet this need. The annual revenue of Ontario from these crown lands amounts to about \$1 per capita.

The total revenue from forest lands held by the Dominion is, in round numbers, \$4,500,000, which all goes to reduce taxes.

"Besides these revenues, the total exports of lumber, timber, pulp wood, and firewood in the last fiscal year, for which returns are available, was \$44,507,528. The home consumption is estimated at \$50,000,000 per year and constantly increasing.

"The value of pulp wood exported in 1890 was \$168,180, while in 1908 it had increased to \$4,037,852, the United States taking \$3,545,530 and Great Britain \$385,199 worth.

"In manufactured wood products the trade with the United States from 1886 to 1908 has increased from \$7,842,526 to \$27,470,574, and with Great Britain during the same period the trade has increased from \$9,354,244 to \$11,843,094, while the total export from Canada during this time has increased from \$18,742,625 to \$44,170,470. In 1908 the total exports of wood products increased to \$49,168,535.

"There is importation of forest products into Canada, principally from the United States, and the value of these imports has increased from \$2,412,572 in 1874 to \$12,032,595 in 1908. For the ten years—1897 to 1906, inclusive—the total imports amounted to \$59,934,770, of which \$57,520,731 was imported from the United States. In 1905 the import of pine alone from Minnesota and Wisconsin was 125,000,000 feet, board-measure, largely to the western prairie provinces. In the other provinces the imports are mostly of hardwood, such as oak, ash, walnut, hickory, and cherry.

"It is claimed that over 8,000,000 acres of waste land in Ontario could be managed for forest crops. There are also over 200,000

acres of sand lands, a large portion of which was formerly farm lands that have been sanded over because of the ruthless destruction of trees. It was shown that the destruction of these forests had also caused a commensurable loss of water-power because the snows of winter and the rains of spring and autumn hold back in an even flow the water fed to the brooks and streams.

"Considerable portions of the waste-sand area in Ontario are being replanted in plats of 100 acres or more at a season, under the direction of the Canadian Forestry Association, and in almost every instance the most barren wastes are beginning to show surprisingly satisfactory results in reforestation. In the prairie provinces, where the soil is richer, the young tree planting has met with even better returns.

"The southern part of the Kingston district the writer has found practically denuded of its best timber, especially along and near the shores of the St. Lawrence River and Lake Ontario. Firewood is selling in Kingston at from \$6.50 to \$7.50 per cord, as compared with half these prices a few years ago.

"On Amherst Island, one of the most beautiful and fertile islands in the district, containing some 13,000 acres, more than 5,000 acres of valuable large and straight white oak, pine, hickory, maple, and basswood timber have been cut and carried away without regard for conservation, so now there are not 100 acres of timberland on the entire island. The population of the island has decreased from 1,300 to 800 since this timber cutting ended, and those remaining are burning fence rails for fuel, or are paying higher prices for coal brought in vessels during the open season. Wood is at a premium and the price is constantly increasing."



The Glacier National Park

The President, on the 12th of May, signed the bill creating the Glacier National Park in the wild, scenic region on the Continental divide. The Canada line is the northern boundary of the park, which extends from the Flathead Valley on the west to the Blackfeet Indian reservation on the east. *Forest and Stream*, which has been the project's strongest advocate, says of it:

"Beautiful to the eye as is the Glacier Park, stupendous as are its mountains and wonderful as are its lakes, snowfields, and glaciers, the park has another value and another beauty quite apart from this. The abundance and variety of game indigenous to its rough mountains is noteworthy. Formerly it was a great range for bison, the dark timber-inhabiting animals, of which a few yet linger in the Yellowstone National Park.

Some moose still inhabit the thick timber of the Glacier Park's mountain slopes, where there are also a very few elk, some mule deer, and some whitetail deer. Black and grizzly bears, and their signs, are seen from time to time. The great importance of the region, however, is as a range for mountain sheep and for white Rocky Mountain goats. In this park there are probably more wild sheep than in any equal area in the United States, and in some sections white goats are very abundant. Only a few years ago some travelers counted at a single view several little bunches of goats—fory in all—feeding in a valley below the snow line near Iceberg Lake.

"With protection and the introduction of a few buffalo, the Glacier Park will become a wonderful preserve for the perpetuation of many forms of the large animal life in North America."



State Must Aid Reforestation

The editor of the *Duluth News Tribune* has his own ideas about what should be done to renew the forest growth of the state. He would let the remaining trees do the reforesting and have the state devote its energy to protecting the new growth. This will do where there are some remaining trees to start things. Where they have been cleaned up altogether the seedlings or the seeds must be furnished by the aid of the state.—*Mississippi Valley Lumberman*.



The Demand for Cypress

Cypress dealers note an increasing demand for cypress in northern markets, where white pine and other native woods have held the field. The claim is made that cypress has been selling, comparatively speaking, much below its intrinsic value, and that the increasing demand will bring about a rise in price.



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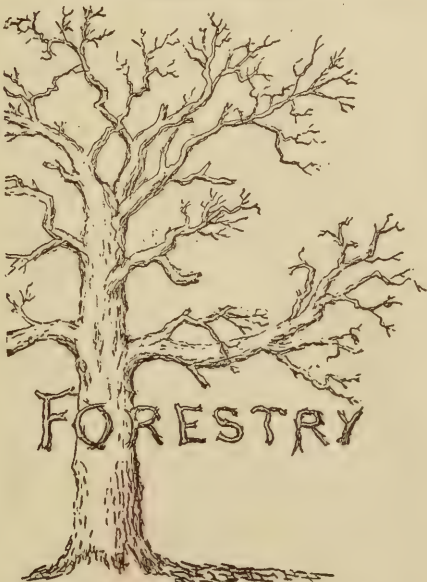
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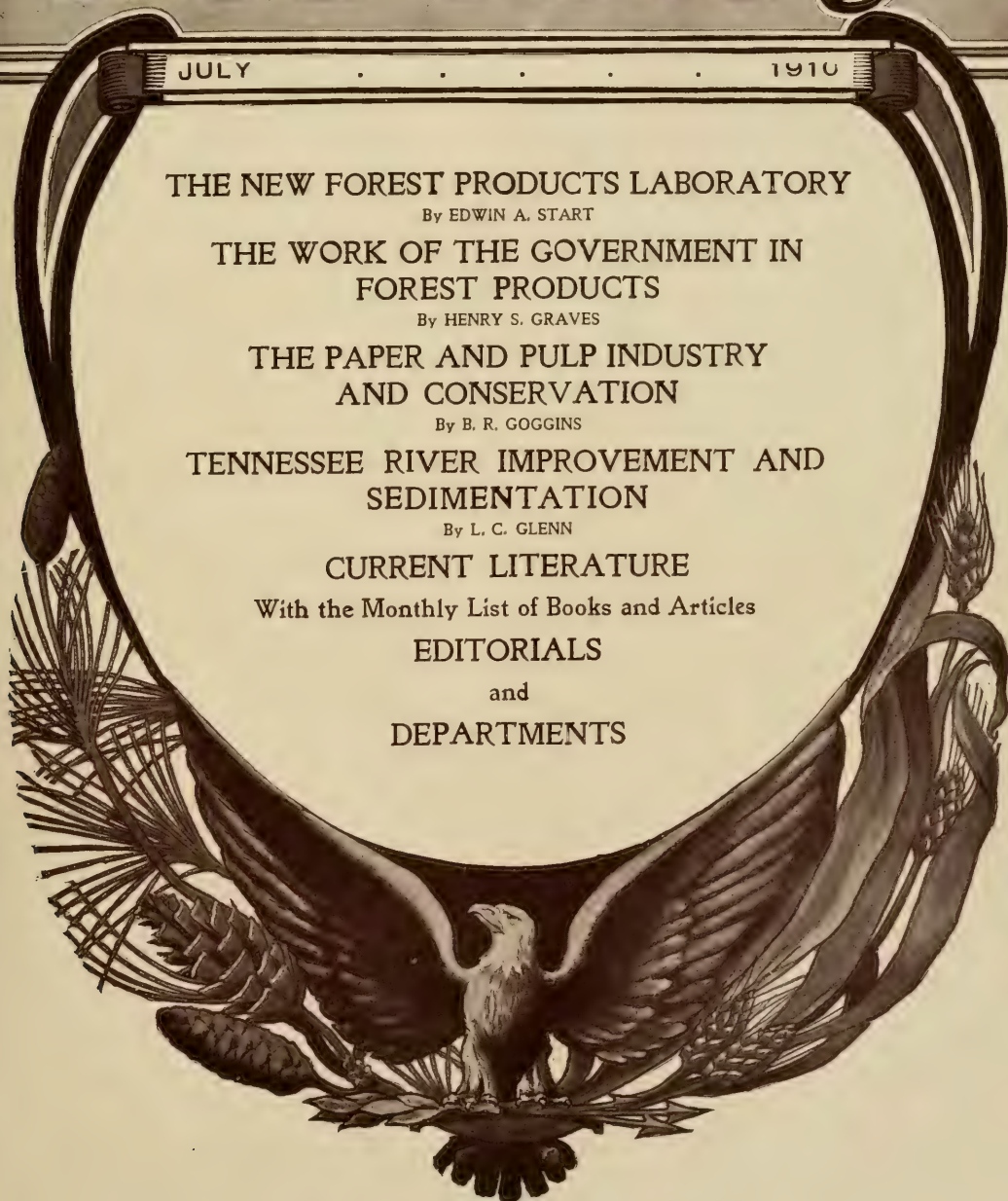
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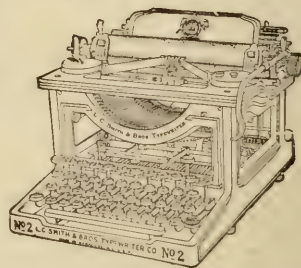
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American Forestry

The Magazine of the American Forestry Association

July

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Indexes for Vol. XV (1909) are ready and may be had on application

The American Forestry Association

is a national organization composed of public-spirited citizens who are interested in the prevention of the wholesale destruction of our forests, in forest extension and utilization, and in the fullest cooperation of national, state, municipal, and private agencies for these purposes. The Association has no business or governmental ties or alliances. Its work is to educate the people to know and understand the value and necessity of forests in the Nation's life and the way to maintain them to the best advantage through scientific forestry; and to bring about such wise legislation as will best secure the desired results. It is the people's forestry advocate and the representative of forestry before the people.

DEPARTMENTS OF WORK

MAGAZINE DEPARTMENT.—This department publishes *American Forestry*, the only popular monthly magazine of national circulation in its field. It has a strong force of editors and contributors and is well illustrated. The subscription price is *two dollars* a year.

EDUCATIONAL DEPARTMENT.—Series of educational and general bulletins and leaflets will be issued at intervals. These will be sent to all members and will be provided for distribution at a nominal cost. The first numbers of the general series are a brief summary of the history and need of the project for National Forests in the southern Appalachian and White mountains; the record of the vote on the Weeks bill, looking to that end, in the Sixtieth Congress; and a part of the argument for the Appalachian forests by the President of the Association, Hon. Curtis Guild, Jr., in his annual address for 1910.

LECTURE SERVICE.—It is proposed to establish a lecture service through which reliable lecturers upon forestry subjects may be obtained. This bureau will arrange with able lecturers at central points who will be available for lectures, with illustrations if desired, before clubs, associations, boards of trade, or general audiences.

CORRESPONDENCE BUREAU.—Through this bureau the Association will furnish information on forestry when possible and provide advocates of the cause with material.

LEGISLATION DEPARTMENT.—As it has always done, the Association will use the agencies at its command to secure the passage of wise legislation in furtherance of its great purpose. Its national character and the location of its main office in Washington enable it to keep in close touch with national legislation and it will cooperate, when practicable, with forestry workers in the several states to promote good state legislation. Its first and most important object in legislation is the passage of a measure for the creation of National Forests, with especial reference to the southern Appalachian and White mountains.

The development of these lines of work to their highest usefulness requires the maintenance of a considerable staff and an expensive plant. Contributions for the work, or for any particular phase of it, are always welcome. The income of the Association by which its general work is supported is derived from membership fees, which are as follows: **Annual members, one dollar yearly; contributing members, ten dollars yearly; sustaining members, twenty-five dollars yearly; life members, one hundred dollars, and patron members, one thousand dollars,** the two latter being exempt from further payments.

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The American Forestry Association

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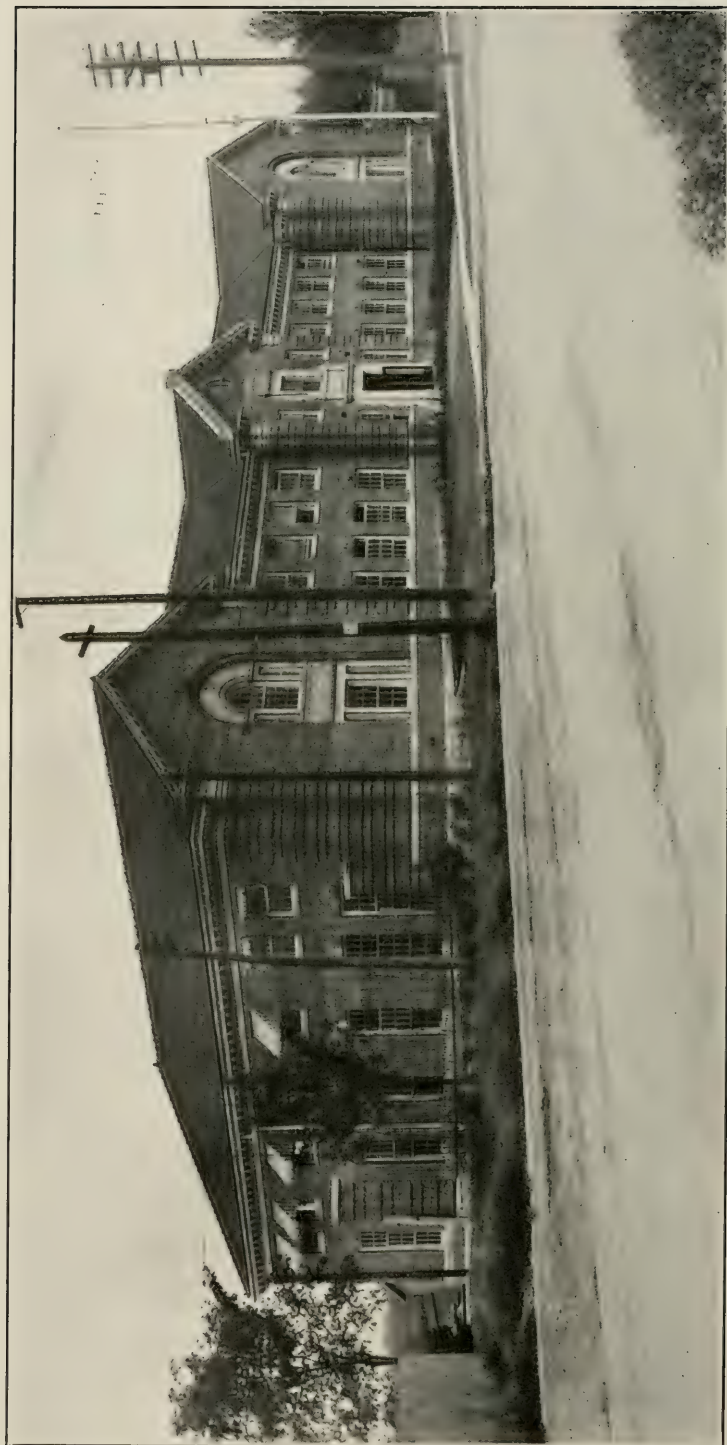
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THE FOREST PRODUCTS LABORATORY

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Vol. XVI

JULY, 1910

No. 7

THE NEW FOREST PRODUCTS LABORATORY

By EDWIN A. START

(Last month, in AMERICAN FORESTRY, William L. Hall, assistant forester in charge of the Branch of Products, United States Forest Service, set forth clearly the key thoughts underlying the work of his branch and the significance of the new laboratory, which was formally opened June 4, and which is described in detail below.)

THERE are still lumbermen, and other citizens less directly interested, who regard the work of the Forest Service as impractical and in the air, but not one of them can come into contact with the branch of products without recognizing the immediate economic value and applicability to business of the solutions of the problems with which it deals, for the task of this branch of the service is to ascertain the best uses for all forest products and the best and cheapest way to obtain them, without waste in the forest or at the mill. That is a simple business question, is it not? And the most hardened Philistine can see it.

And because no capable business man can fail to see this, and because the work of the branch of products is only an interlocking and dependent part of the whole forestry program, this branch has in its power, with the facilities it now commands, to do more than any other agency to educate the men of the wood-using industries into true believers in the complete forestry gospel.

It is about five years since the efforts began to obtain such a laboratory, but Congress would not provide for it, and it was only through the cooperation of the University of Wisconsin that it was finally made possible. There was a keen rivalry between Minnesota, Wisconsin, and Michigan for the institution, but it was finally located in Wisconsin. No mistake would have been made in locating it in any one of these states, but to an unprejudiced observer the present surroundings seem particularly fortunate. Wisconsin still ranks near the head of the list of lumber states and its paper and other wood-using industries are important. Its prosperity rests on the fundamental industries of the soil and the forest. In the development of its university it closely followed Michigan as the western leader in higher educational work, and for many years its university has ranked with the first state universities of the country. In no state has the university so nearly met the needs of the people and made itself so much a part of their daily lives. Here is realized the ideal which was in the minds of the founders of William and Mary College, when they put it down at one end of the Duke of Gloucester Street in the old colonial capital of Virginia, looking through the long vista to the capital at the other. From



DESTRUCTIVE DISTILLATION

this juxtaposition, Washington, who was chancellor of the old Virginia college, drew the idea of a great national university in the nation's capital, an idea which was never carried out, although he made a bequest to the nation for the purpose. This northwestern state has become the heir of the tradition, and in Madison it is carried out physically and in spirit, for the university is the real leader of thought and development in the state. Its great central building looks down State Street to the capitol. Its library, an exceptionally fine one, worthily housed, is the state library as well. Educators and legislators work together for the state; not, indeed, without much of the friction inevitable in our politics, but with good results in the large.

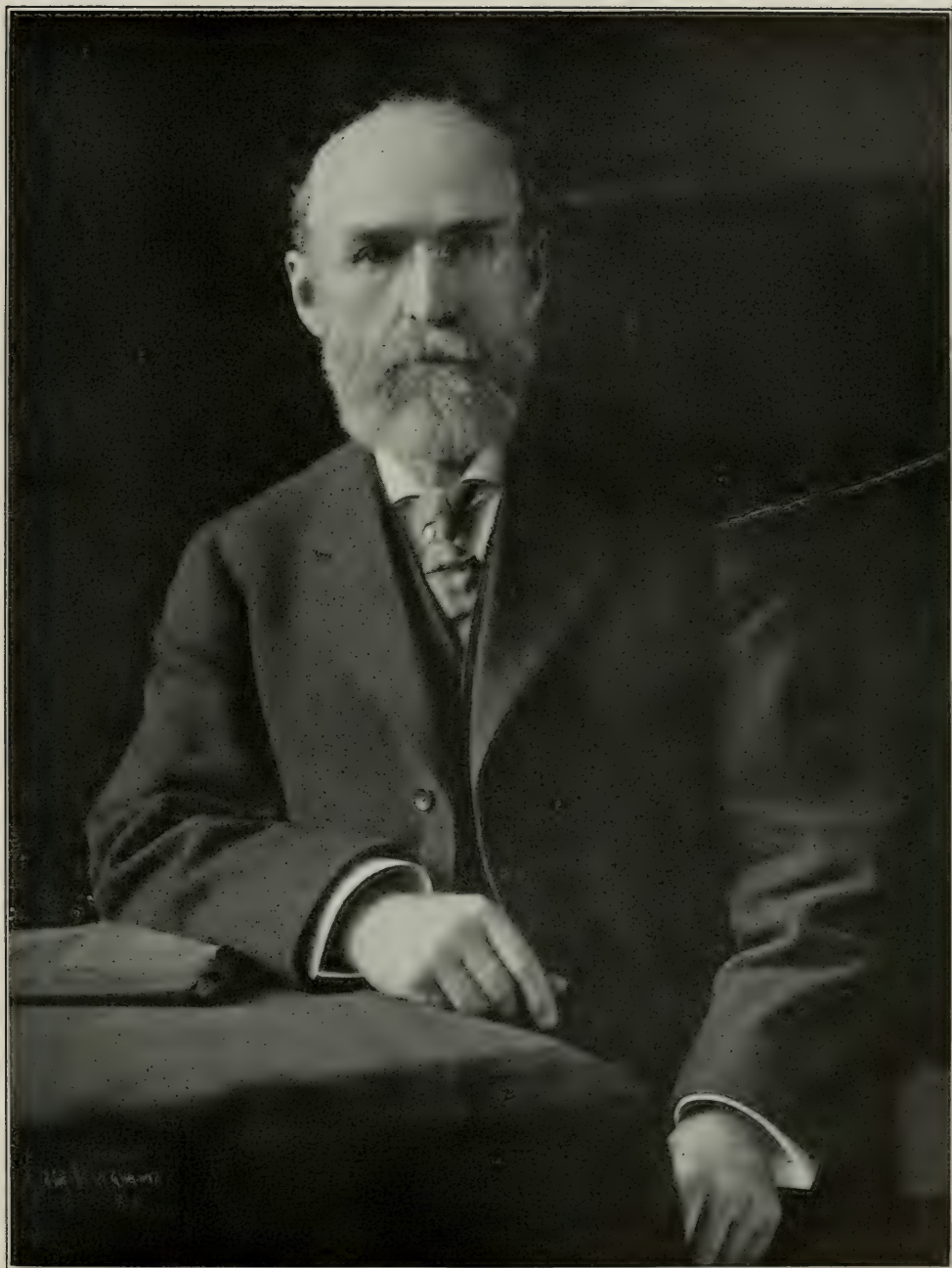
Wisconsin also still has great forests and wood-using industries, the latter consuming annually over 900,000,000 feet of lumber, valued at \$20,000,000, fifty-one per cent of which comes from without the state, the forests of which are now threatened with early ex-

haustion. This does not take into account large quantities of material from the sawmills that is not considered available for future manufacture. The problem of preventing waste by more complete utilization is therefore of the highest importance to the future prosperity of the state. Wisconsin also has a state forest service of great efficiency, free from political control, which goes at things in a vigorous, western way and has a definite policy that is pursued with steady purpose.

The city of Madison is rarely endowed by nature so that the environment is in every way favorable for the life and work of the products staff of the Forest Service which, as our readers know, will now have its headquarters in Madison, instead of in Washington.

THE OPENING EXERCISES

The new plant, in its extent and completeness, was a gratifying surprise to most of those who saw it for the first



CHARLES R. VAN HISE

President of the University of Wisconsin, Chairman of the State Board of Forestry, and one of the foremost advocates of conservation of natural resources



WASTEFUL LUMBERING

Redwood, red fir, and spruce in California

time at the formal opening on the 4th of June. Typical operations were in progress in all the departments, and the visitors, numbering nearly 500, had an opportunity to see the plant in action. There were in attendance representatives of the American Paper and Pulp Association, Beer Stave Manufacturers' Association, Michigan Hardwood Manufacturers' Association; National Box Manufacturers' Association, National Electric Light Association, National Hardwood Lumber Association, National Slack Cooperage Manufacturers' Association, National Lumber Manufacturers' Association, National Hickory Association, National Wagon Manufacturers' Association, Wheelmakers' Club, Northern Hemlock and Hardwood Manufacturers' As-

sociation, Northern Pine Manufacturers' Association, Northwestern Cedarmen's Association, Vehicle Woodstock Company, Wood Preservers' Association, Yellow Pine Manufacturers' Association, Field Museum, Chicago; American Society of Civil Engineers, American Forestry Association, educational institutions, technical periodicals, railroads, and large concerns engaged in every wood-using industry.

The exercises were simple and appropriate. The building was inspected and the work explained during the fore-

noon, and, after luncheon, attended by about 150, in one of the university halls, there were addresses by Governor Davidson, Henry S. Graves, forester of the United States; Charles R. Van Hise, president of the University of Wisconsin; Capt. J. B. White, chairman of the Committee on Conservation, National Lumber Manufacturers' Association; B. R. Goggins, of Grand Rapids, Wis., representing the American Paper and Pulp Association, and O. B. Bannister, of Muncie, Ind., representing the implement and vehicle industries. The speaking was in every way suited to the occasion, each speaker filling well a distinct place. Ex-Governor W. D. Hoard, chairman of the board of regents of the university, presided.



WASTEFUL LOGGING OF WHITE PINE

The trees are felled without attention to possible breaks and logs are cut from trees with no attention to "timber fitting"

Governor Davidson, speaking for the state, set forth with abundant facts its relation to this national institution that has been placed in Wisconsin with the cooperation of the state. He used an array of statistics in regard to the forest products of the state, which are just being made available through joint investigations of the United States and Wisconsin forest services. Of the inter-dependence of natural resources, the governor well said:

Every one of our great natural resources exerts far-reaching influence. Every industry in this country has profited vastly by the existence of our iron and coal deposits. In the same way, every industry in the United States has been helped—indeed, has been more than helped: has been in part created—by an abundant supply of the most useful kinds of timber.

The forest, in fact, bears a relation to other resources and to their dependent industries which is entirely peculiar. If we speak of the right use of the forest, and understand the full meaning of our words, we know that we cover not only the products which come from the trees themselves, but the influence which the forest bears to resources and industries outside of itself. If we speak of forest waste, we should bear in mind that our meaning extends not only to wood that is not used, but to soil which cannot be used, water which cannot be used, improvements which cannot be used, and even power which cannot be used, because of the misuse of that controlling factor, the forest.

I want to make very clear this point—that when we misuse the forest, we waste not only its products, but, also, other very important resources. Nature has placed in effect a direct and vital relation between forests and soils, and forests and streams, that must be heeded by man if he is to reap a full harvest from any of these resources.

And of waste in lumbering, he said (and in Wisconsin people know something about this):

It is of great importance to all wood-using industries of the United States to bear in mind that our present imperfect use of the forest also causes great waste of wood itself, which is a most important material. This waste begins when the lumberman first sinks his ax into the tree in the woods, and does not end until the piece of wood is fitted into final form and goes into use. We waste about half of the tree getting the other half into useful form. It has been the practice to leave a considerable part of the tree, and oftentimes the very best part, in the stump.

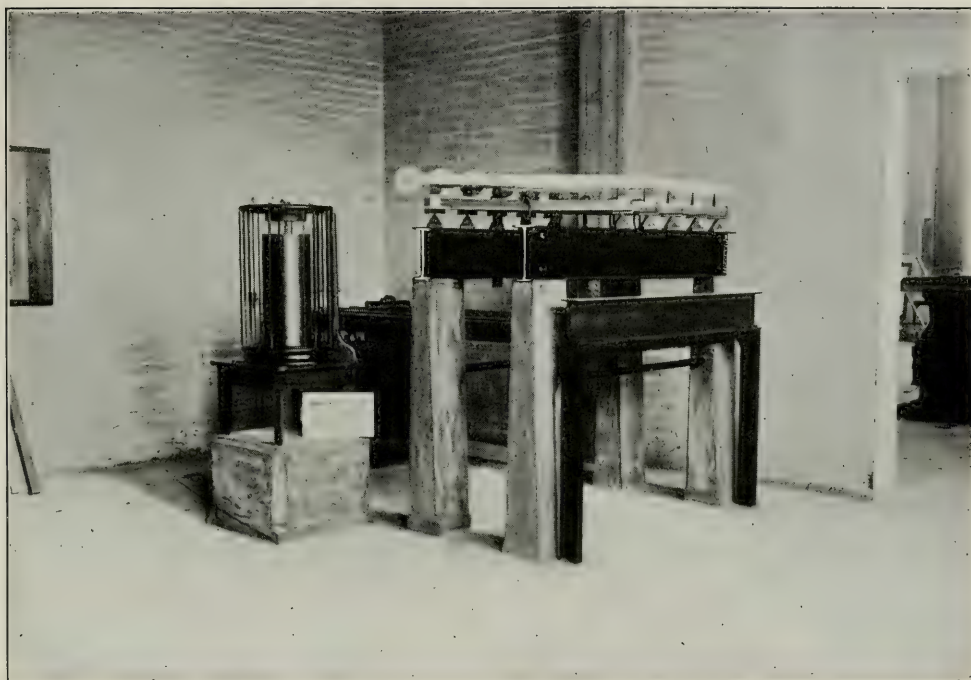
A lot of wood is wasted in the tops. Many trees are cut and felled, but never taken out of the woods, because they are in part defective. Yet they contain much sound wood. In the old white pine operations in Michigan and Wisconsin, only prime logs were taken. Lumbermen working near these old operations during the past few years found it profitable to take out a considerable number of these which still remain sound. Many logs are also lost. Some are left in the woods, but more sink into the streams. Probably as much as twenty-five per cent of the wood which is cut down in the forest is left there to decay.

Mr. Graves set forth the work and plans of the service of which he is the head, as expressed in this new realization of its ideals. His address, "The Work of the Government in Forest Products," is printed elsewhere in this magazine, as is the address of Mr. Goggins, of the American Paper and Pulp Association, setting forth the relation of his constituency to this work.

Captain White gave some instances showing the early interest of the lumbermen in the work represented by the new laboratory. Among others, he made the point, a favorite one with him, and a just one, of the cost of conservation. On this he said:

Once the farmer reaped and put nothing back for the soil. He gathered all, and the consumer got the benefit of cheap farm products. But he has now learned that he must put back into the soil the chemical food necessary to sustain it. He must add this to the cost of the product, and the consumer must pay the bill. Hence, conservation doesn't necessarily mean that through its practice everything is to be cheaper, but it does mean that all the necessities of life, with its comforts and blessings, shall continue, and that there never shall be famine, human suffering, or want caused by useless waste and extravagance.

There will be no more 10-cent corn and no more \$10 lumber. The farmer who feeds 50-cent corn to his hogs and his steers will necessarily get higher prices for his beef and bacon. And the lumberman, now that the day has passed when there was an enormous surplus of timber, when it had to be burned to make way for settlement and cultivation of the land; now that he has to conserve and grow his forest, has got to add thereto the cost of the forest growth, and the consumer will pay the bill. Yet we are each and all consumers of each other's products, and thus it is all evened up by our paying each other's bills. There is no economical



THE FOREST PRODUCTS LABORATORY

Timber Physics. Dead load testing machine

principle through which one can continue to secure to himself any product at less than it costs to produce that product.

President Van Hise spoke on conservation and on the relation of his great university to this new project with the force and cogency which his scientific knowledge and his profound convictions give to all his utterances on these subjects.

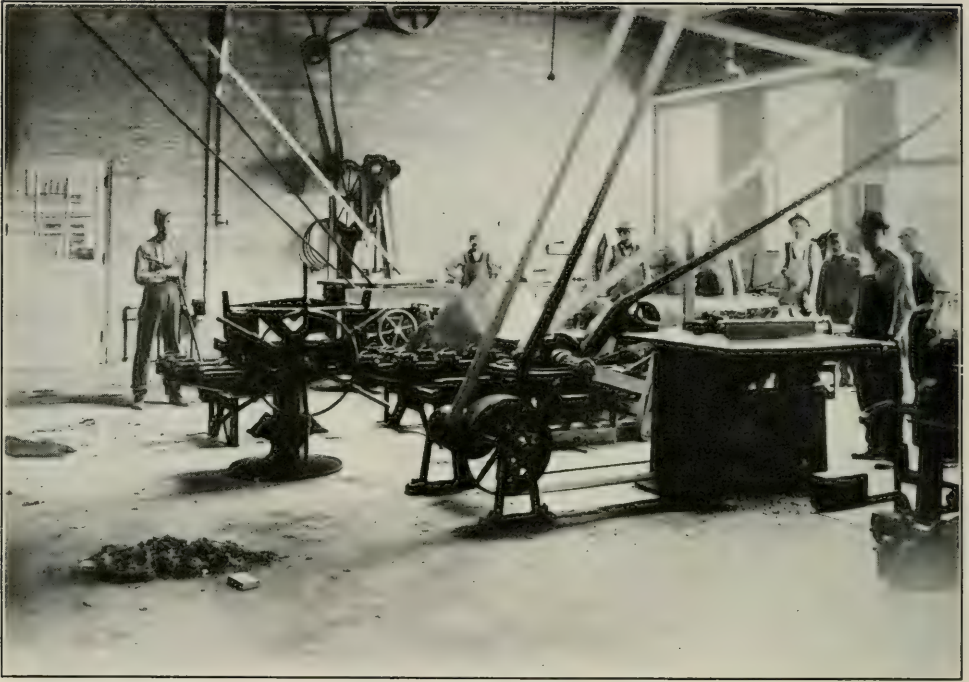
The speaking was well closed by Mr. Bannister, who aptly represented an industry that has already learned the practical business value of the work of the forest products branch, whose tests made possible the reclassification of hickory and the use of the formerly discarded red hickory. Mr. Bannister referred to this in his address.

That there was general interest in the new laboratory and great satisfaction with it on the part of the visitors no one who was present could doubt. As one cooperage man was heard to say to another after watching a dem-

onstration of the structure of different varieties of oak: "This shows us the reason for things we have simply run against in our experience without understanding them." This more perfect knowledge is certainly worth something.

THE PLANT

The laboratory is a substantial, attractive two-story brick building, 180 feet long and eighty feet wide. It was erected, and will be supplied with water, light, heat, and power by the state of Wisconsin. The United States, through the Forest Service, provides the equipment and the staff and all other maintenance. As a further evidence of the fine spirit of cooperation which is embodied here, it may be noted that the railroads are furnishing free carriage for the supplies of the laboratory, and that lumber companies and associations are giving material of great value for experimental purposes.



THE FOREST PRODUCTS LABORATORY

The wood working shop

On the ground floor are the paper and pulp mills, laboratories for timber physics and timber testing, wood preservation, and wood distillation, and the woodworking shop. The last is fully equipped with saws, planers, and all required woodworking machinery. In the rear of the building is a spur track by which timber and other supplies can be brought to the door on the car. There is also a roomy storage shed, and there are two large tanks for storing preservatives.

On the second floor are the offices of the assistant forester in charge of the branch of products, William L. Hall; the director of the laboratory, McGarvey Cline, and the assistant directors, H. S. Bristol, and H. S. Weiss. There is a large lecture room and there are offices for the computing clerks, files and other requirements of a highly organized modern business. Also on this floor are the chemical laboratories, drafting room and photographic dark room. The building is airy, well lighted, and at-

tractive—yet already the young enthusiasts of the service, who dream of to-morrows while they work at the tasks of to-day, are talking of possible enlargement in the near future. This is a healthy sign. The work grows constantly, not only in scope, but in real value as well.

THE BRANCH OF PRODUCTS

The branch of products undertakes to conduct investigations and disseminate information regarding the mechanical, physical, and chemical characteristics and properties of wood, utilization of forest products, air seasoning and artificial drying of wood, agencies destructive to wood, wood preservation, wood distillation, production of naval stores, pulp and paper and other chemical industries using forest products, chemical analyses of forest products and materials used in their treatment; statistics of production, consumption and prices of forest products, proc-

esses and waste in their manufacture and use, standard requirements, and substitutions of wood with other materials. In carrying out projects along these lines, it is required that there be a clear and definite object, method and record, for it is the part of this organization to do those things which business men need to have done but cannot do because of pressure of the immediate business of the day. Here there can be experiment, study, computation, and so full and exact a record that the results will always be of use, and available.

Forest products is not a new branch of the service, and a very complete organization and method of procedure have already been worked out. The scope and plan of the organization are shown in the accompanying diagram.

5. Wood Pulp, in charge of E. Sudermeister.

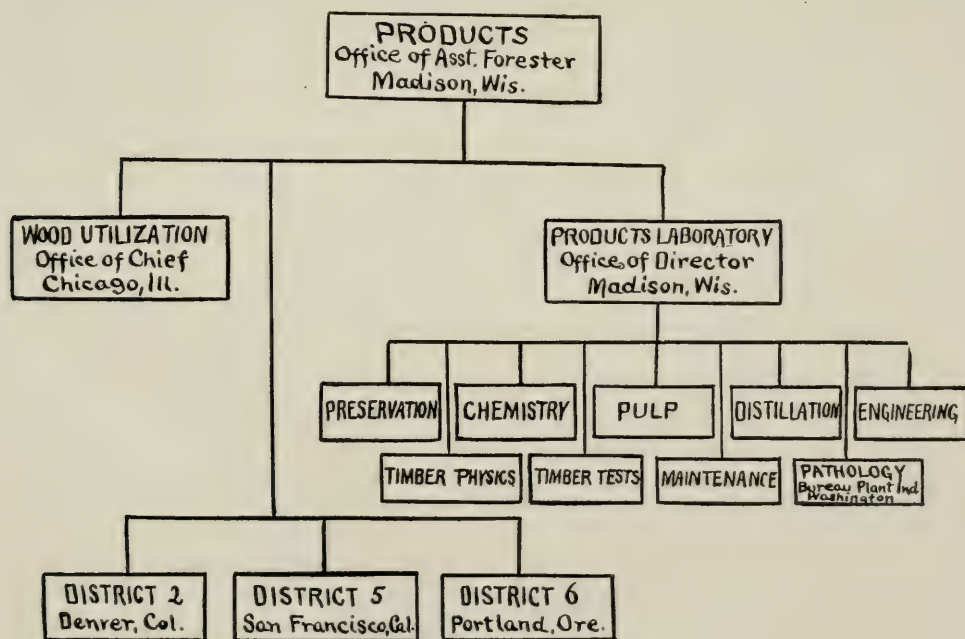
6. Chemistry, in charge of Ernest Bateman.

7. Engineering, in charge of Rolf Thelen.

8. Pathology. (This is conducted in connection with the Bureau of Plant Industry at Washington, by C. J. Humphrey.)

9. Maintenance, a non-technical section, in charge of W. K. Kempfer.

On the staff of the laboratory are four Yale men, including the assistant directors; three Cornell men, two from Purdue, two from Massachusetts Institute of Technology, two from Ohio State University, and one each from Stevens Institute of Technology, University of Maine, University of Michigan, and University of California.



The work of the laboratory is divided into nine sections:

1. Timber Physics, in charge of H. D. Tiemann.
2. Timber Tests, in charge of J. A. Newlin.
3. Wood Preservation, in charge of F. N. Bond.
4. Wood Distillation, in charge of L. F. Hawley.

An outline of the different sections, the projects that they have in hand, and the equipment with which they have to work, will give a comprehensive idea of the function of this laboratory.

TIMBER PHYSICS

It is the business of the section of timber physics to study the structural and physical properties of wood and

to ascertain how these properties are affected by different methods of drying and handling. This section has in hand at present a microscopic examination of American woods for the purpose of developing a key to their identification based on the structure of the wood; experiments to determine heat conductivity and other heat constants for the principal commercial timbers. In the kiln drying of lumber and in the treatment of woods with preservatives it is of importance to know how much heat is required, and how long it takes to heat wood to a given temperature. A third line of experiments is the study of different methods of drying wood.

The equipment of this section includes microscopes, microtomes, and other apparatus required for microscopic work, apparatus for taking microphotographs, a cylinder designed for the study of the different methods of drying wood, and an experimental dry-kiln, balancers, ovens, calorimeters, and other miscellaneous equipment.

TIMBER TESTS

In the section of timber tests studies are made of the strength, stiffness, hardness, and other mechanical properties of commercial wood. There are some very interesting machines for determining these points. Tests are made on woods that have been treated with preservatives and other substances to determine the effect of the preservative treatment upon the mechanical properties of the natural wood.

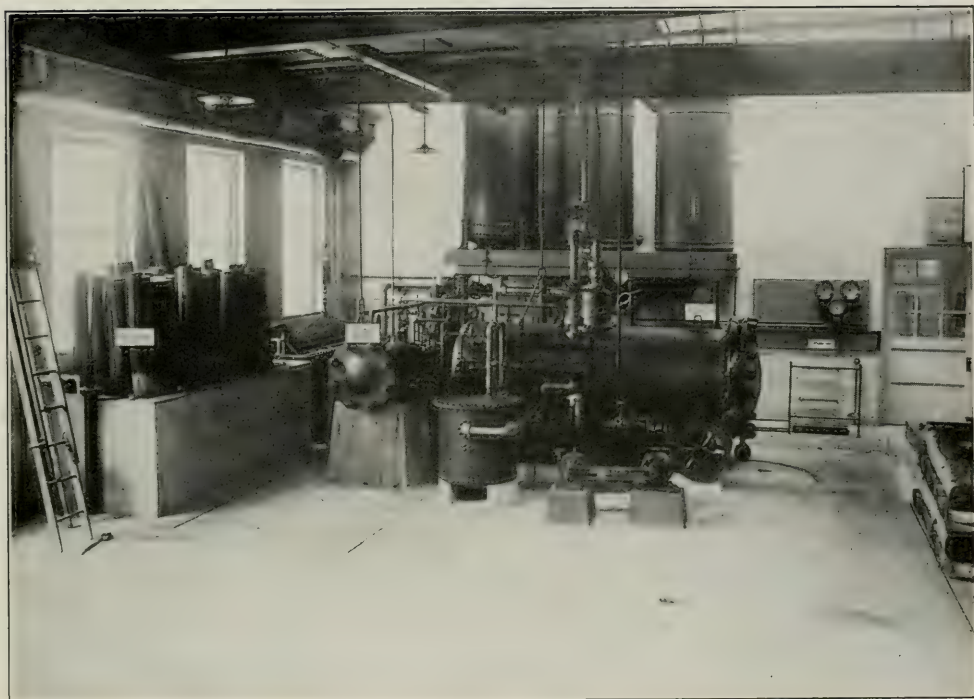
The lines of work to be taken up in this section include tests of the different commercial woods to determine their relative strength, toughness, hardness, etc. This work is of particular value to wood users in finding substitutes for woods now becoming scarce. It is the same type of work that led to the discovery which has already been referred to of the value of red hickory. Tests will also be made to determine the influence of knots, checks, and other defects used in grading structural timbers upon their

strength and other mechanical properties. The results of these tests, of course, will be of great value to architects, engineers, and lumbermen in making specifications and grading rules for structural timber. Tests will be made to determine the strength of wood under dead, impact, or repetitive loading. Such tests will assist in determining the working stress that may be used upon timber structures. One of the interesting pieces of apparatus used in this laboratory is the machine for making the dead-load test, and one of the surprising results which the record of this machine shows is that the rapidity of loading does not affect the elasticity of the wood. The mechanical properties of wood that is impregnated with creosote and other preservatives will also be determined in this section.

The equipment of this laboratory includes one 200,000-pound extension-base Reihle testing machine, one 150,000-pound extension-base Olsen testing machine, three 30,000-pound Olsen universal testing machines, one 60,000-inch-pound Reihle torsion machine, one Dory abrasion machine, one impact testing machine, deflectometers, and other instruments used in testing structural materials. Our illustrations show some of this machinery. The nature of some of the timber tests is also shown in some of the accompanying illustrations.

WOOD PRESERVATION

This is an interesting and important section. More and more it becomes necessary, in the face of a diminishing timber supply, to preserve in some fashion poles, posts, ties, and all timbers that are exposed to influences that will cause them to deteriorate. Somehow their life must be extended until supplies can be regrown. Much progress has been made in the work of wood preservation, but a great deal remains to be learned. This section is making a broad study of the problems involved. These deal with the preservatives themselves and their effects upon wood, and with the methods of impregnating the



THE FOREST PRODUCTS LABORATORY

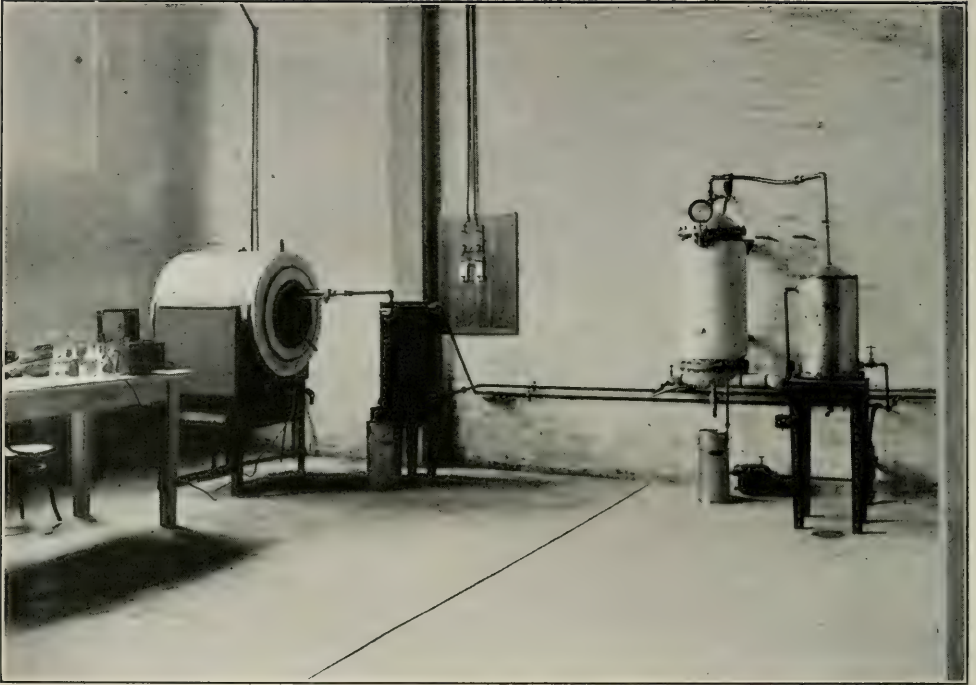
Wood preservation. Open tank treatment on the left; commercial treating plant in the centre

wood most effectively with the preservatives.

To study the first class of these problems, the laboratory is provided with a fungus pit, which contains chambers in which the wood can be thoroughly inoculated with various destructive fungi. The humidity and temperature of the pit can be regulated to produce conditions most favorable to fungus growth. Woods treated with different preservatives are placed in this pit, where they can be isolated in chambers. The efficiency of the preservative is indicated by the ability of the wood treated with it to ward off the attacks of fungi under these conditions.

The second class of problems involving the impregnation of wood are chiefly those of mechanical engineering and the plant of the laboratory is most complete in this respect. It is, in fact, a reproduction of a fully developed commercial plant. The machinery is provided for forcing any required amount of preservative into the species

and forms of wood which may be tested. This is done under high pressure, and the treated cylinders are tested for great resistance. The outfit includes one treating cylinder three and one-half feet in diameter and twelve feet in length, which will withstand a working pressure of 300 pounds to the square inch. There is also a small experimental cylinder one and one-half feet in diameter and three feet long, designed to withstand a working pressure of 600 pounds to the square inch. This apparatus is connected with a system of tanks, force, air, and vacuum pumps for handling these preservatives and forcing them into the wood. There is also an open tank outfit for the simpler treatment of butts of posts and poles, such as is practicable for farmers and others using much of this material but not enough to justify having recourse to a commercial plant. In this connection it may be suggested that time only can tell what and how much superior value the closed tank



THE FOREST PRODUCTS LABORATORY

Wood distillation

pressure treatment has over the simpler and far less expensive open tank process. The theory is, and there is no reason to doubt its correctness, that the deeper the preservative is forced into the wood the less will be the opportunity for fungi to enter. Those who cannot use this elaborate treatment, however, need not despair, for there is known to be great value in open tank treatment, or even in the application with a brush of good preservatives.

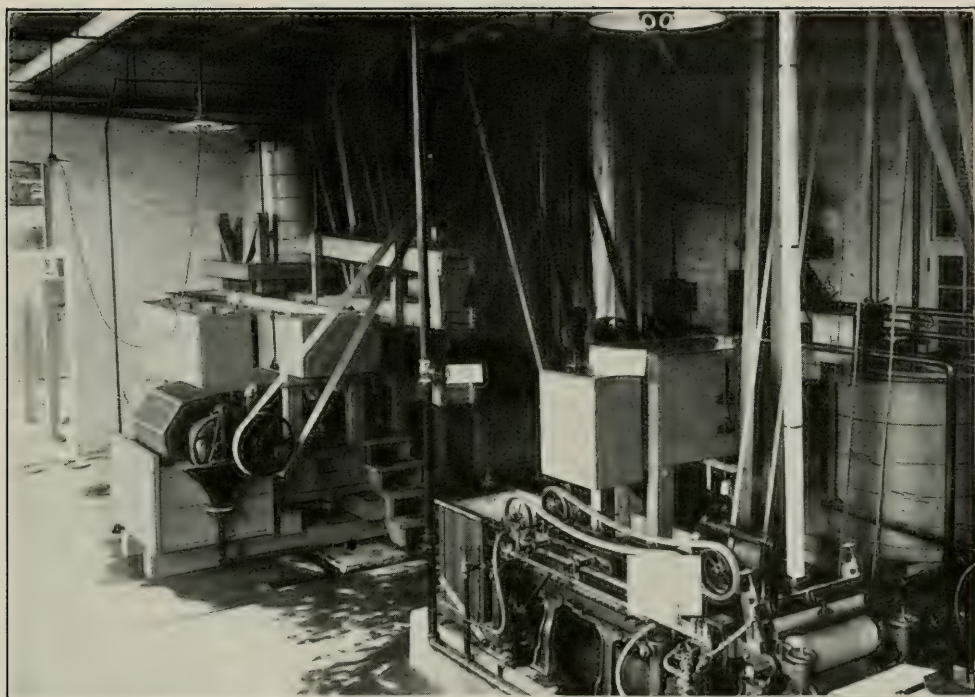
WOOD DISTILLATION

Alcohol, turpentine, wood creosote, and acetates are the present best known products of wood distillation. It is the task of this section to conduct experiments to determine what products of this kind can be secured from different woods, and the best processes for obtaining them; to study the design and operation of machinery best adapted for the production of these by-products so that they can be produced most eco-

nomically, both as to quantity and quality, and to study the refining of crude products. It is obvious to anyone who has noted the development of these industries that here is a large field for the utilization of much material that now is wasted. Already, great advances have been made, and there is no question in anybody's mind that greater still are not far distant.

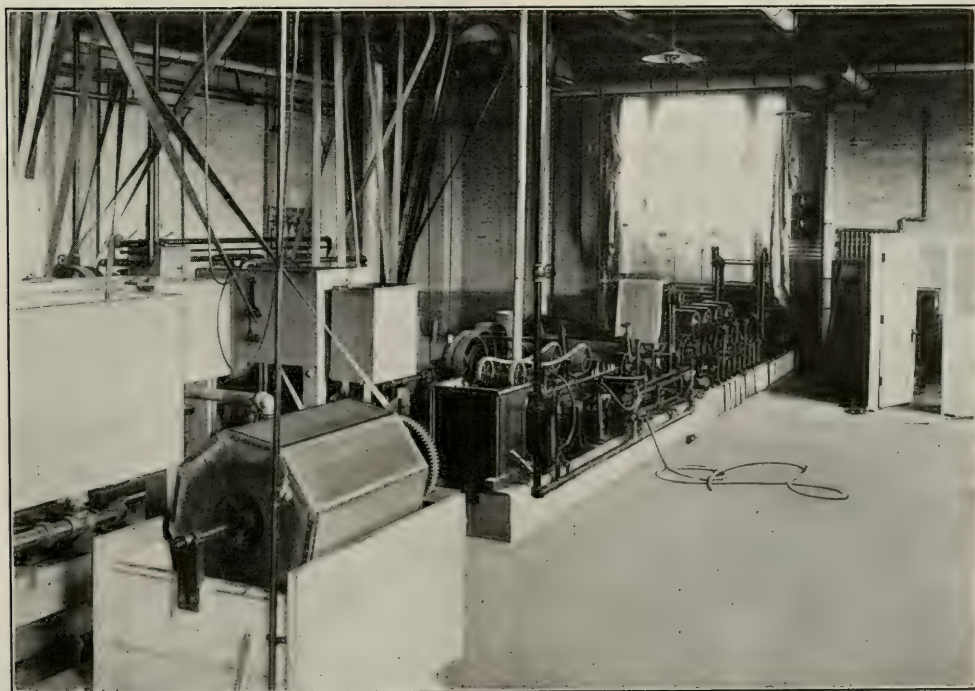
The species to be first studied are southern pine, Douglas fir, Norway pine, and other resinous woods. Already the products that can be obtained from these woods are known, but there is greater room for improvement in the methods of production and refining. The distillation of different hardwoods will also be studied. Slabs, sawdust, stumps, and all forms of mill and forest waste are material for such a laboratory as this.

The equipment includes a steam distillation and extraction retort; one oil-jacketed destructive distillation retort, and three product continuous refining still and accessory apparatus.



THE FOREST PRODUCTS LABORATORY

One end of pulp and paper mill



THE FOREST PRODUCTS LABORATORY

The pulp and paper mill, showing the little 15-inch Fourdrinier paper machine

WOOD PULP

No section deals with problems of greater interest to the country than this, and none is better furnished for its work. There is a working model of all the apparatus of the paper and pulp mill, with the exception of a mill for making groundwood pulp. This omission is to be filled at an early date. All the apparatus for making pulp by the soda and sulphite processes is here and a system of grinders and beaters, culminating in a complete Fourdrinier paper machine, making a roll of paper fifteen inches wide. This miniature of the giant machines is equally serviceable for experimental purposes, and much more economical to operate.

This section is grappling with problems of the great paper industry—problems which are growing more pressing every day. The special points of attack at present outlined are methods of making ground-wood pulp to determine whether or not commercial pulp can be made from species other than spruce; the practicability of treating different woods with the sulphite and soda processes; the qualities of paper which can be made from different grades of the various sulphite, soda, and ground-wood fibers; and the practicability of using different forms of wood waste for the manufacture of paper pulp and other fiber products. There is here a great field and one beset with difficulties such as only experimenters in it can realize. There is so much paper required by our modern civilization that to produce wood pulp by sufficiently economical processes to meet our demands for paper is entirely another question from producing it experimentally. It has been satisfactorily determined that wood pulp well adapted for many purposes can be produced from a number of annual plants, but the production of these plants and the elimination of certain troublesome constituents make the process too expensive to be at present of commercial value. The remedy for this must be found by long and patient experiment. At present the principal end in view is the

study of the utility of different varieties of wood as substitutes for the fast-disappearing spruce.

CHEMISTRY

The section of chemistry has a hand in nearly all of the problems that are presented to the branch of products. The laboratory in which the chemical analysis is performed is thoroughly equipped and arranged with great convenience, with due regard to the comfort and safety of the experimenters and to efficiency of work. Experiments with noxious gases are conducted in a glass hood so that the chemist is not exposed to the effect of the gases. The special purposes of the section are to find uses for products at present having little or no commercial value, to secure data upon which to base commercial specifications for wood products, wood preservatives, and other chemicals used in the treatment of wood, and to study chemical problems that arise in connection with the work of the other sections. In carrying out these purposes, the present lines of investigation are the analysis and grading of commercial creosote, the analysis and grading of wood turpentine, and methods of analyzing treated wood to determine the kind and quantity of preservative in it. This last is necessary to check up the results of the timber tests with the treated woods, and also to gauge the treating process itself.

ENGINEERING

This section has to do with the design of machines and apparatus to be used in saving wood waste. It is only a part of the problem to find how a given wood may be used or what products can be made from waste material. It is equally necessary that machines and equipment should be designed which will accomplish the desired results. Problems at present engaging the attention of this section are the design of an experimental grinder for the manufacture of ground-wood pulp from woods other than spruce; the de-



THE FOREST PRODUCTS LABORATORY

The chemical laboratory

sign of a dry-kiln for experimental purposes; the design of a hack for shallow chipping in turpentine experiments; the preparation of standard designs for different types of treating plants, including portable plants for the treatment of posts and poles, low and high pressure plants of varying capacities, receiving and storage tanks, gauges and accessory apparatus, plans for the general arrangement of equipment and for yard storage and transportation. The importance of this task will be understood by those who are aware of the fact that it is just this development of a satisfactory economic plant that many of the larger electric companies and railways which are deeply interested in preserving timbers are waiting for. The section of engineering has charge of the woodworking and machine shops in the laboratory.

The remaining technical section of the branch of products is that of

PATHOLOGY

This section investigates the diseases which cause the decay of wood. Its work is closely allied with that of wood preservation, and the problems will be of the same kind, although the work of the two sections will be entirely distinct. The work in forest pathology is conducted in the bureau of plant industry of the Department of Agriculture in Washington, and that bureau provides the working staff and has charge of the technical methods.

THE OFFICE OF WOOD UTILIZATION

An important division of the branch of products is the office of wood utilization in Chicago, in charge of Homer S. Sackett. This office takes up the problems of the branch of products

which do not require laboratory work, those which can be solved by cooperative studies with the manufacturers, or which can be worked out by statistical study. The question is sometimes asked why this office is located in Chicago. The answer is in a sense an explanation of the nature of its work. Chicago is not only central, but it contains every industry that is concerned with forest products. When any information is needed in regard to the results and requirements of any industry, Mr. Sackett can get into communication with representatives of that industry without delay. Seventeen of the great wood-industry organizations have secretaries or managers in Chicago. Chicago is the greatest lumber and wood-manufacturing center in the country. These are a few of the most cogent among many reasons for the establishment of this office here.

The nature of the work of this office is suggested by some of the projects at present on the program. A report has already been made on the vexed question of odd lengths. This shows that in the yellow pine district of the south one and twenty-one one-hundredths per cent of the products of the planing mill are wasted annually because of the non-manufacture of odd lengths. This entails a loss of about \$600,000. The report urges the manufacture of odd lengths with some concession to the buyer.

Samples of red cedar, alligator juniper, western juniper, redwood, incense cedar, western red cedar, Port Orford cedar, and Alaska cypress from the national forests of the Rocky Mountains and mountain cedar from a private forest in Texas have been furnished to four of the largest pencil manufacturers of the east, and they will give them a thorough trying out for pencil manufacture. A report is about due on this work. In a similar way, several western woods are being sampled for the manufacture of shuttles. With the assistance of manufacturers of butter and tobacco boxes, a test is being made of

short lengths of cypress for these purposes, and of incense cedar for tobacco boxes.

At the request of the National Hickory Association, a study of better methods of utilizing hickory will soon be begun and is expected to occupy about four months.

Studies are being made of markets and market reports; and statistics of consumption have been gathered in cooperation with Massachusetts, North Carolina, Kentucky, Wisconsin, and Maryland. The service alone has gathered the statistics for Illinois. These reports are of great value. "They show what part of the total demand, and of the demand for each species, is met by forests and woodlots in the state, and what part is supplied from without. The kinds of wood demanded by the various industries are shown, together with the amount of each species used, the prices paid at the factory, and into what product each wood is manufactured. With this information before them, the woodlot owners who are looking to the future can determine what kinds of timber promise best returns and can give preference to those kinds. Those who have timber or lumber to sell can form an intelligent opinion as to where the best market can be found for what they have to offer. On the other hand, the manufacturer who is in the market for woods of certain kinds, will have the means to determine whether he can buy near home or whether he must look beyond the state; and a study of average prices paid by others will show whether or not he has been buying on an equal footing with others."

The Massachusetts report is printed, by that state, and those for Wisconsin, North Carolina, and Maryland are in type. These studies will be continued the coming season in Louisiana, Michigan, Missouri, and Pennsylvania.

The office also gathers statistics of cost and prices, giving data not heretofore available in any form.

The office has taken up the question of fiber and wood boxes. While be-

lieving that fiber as a box material has its place, and has come to stay, Mr. Sackett has reached certain conclusions under which he regards wooden boxes as more desirable for general use under present conditions. As an element in conservation, fiber has the same drawback as wood pulp, for since everything can be used its adoption on a large scale tends to more complete forest destruction. The question is now being taken up by the National Box Manufacturers' Association and National Lumber Manufacturers' Association. Accurate information is sought on the amount of business lost by wooden box manufacturers, and on the character of the material going into the fiber, whether mill waste or material that should go into high-grade lumber.

These few examples illustrate the wide range of inquiries continually opening before this office, which, through close relations with the manufacturers, can do much to promote the most complete and economic utilization of all the products of forest and mill. It is the business of the office to show the manufacturer how he can add to the profits of his business by reducing waste and economizing production.

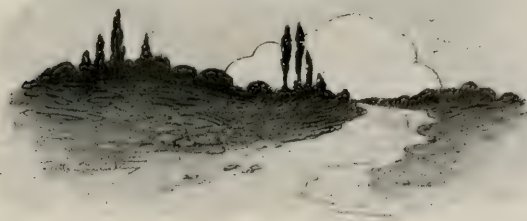
CONCLUSION

For several days following the opening of the laboratory, the heads of the sections and divisions of the branch of

products from all of the different offices were in conference at Madison, with the purpose of developing their program and organizing their work so as to take up slack all along the line, cut red tape as much as possible, and bring the methods of their branch up to the highest standard of business efficiency. In the systematic methods and the actuating spirit of this conference, with its strong *esprit du corps*, there is something admirable and full of assurance for the future of the great work entrusted to this group of young men.

The fact cannot be too strongly emphasized that the new laboratory, as well as every office of the branch, wherever located, is national in its work and outlook. Removal from Washington does not localize it in the least. In fact, it broadens the outlook, inasmuch as it takes it out of the official atmosphere of the national capital, right among the people who are doing the work with which its activities are directly concerned. Through its several offices, it reaches into all parts of the country, touching the users of wood at all points, and supplementing with its admirable facilities for experiment the daily practical experience of business.

The new laboratory is the most extensive and best equipped of its kind in America, and probably in the world, and it is in the hands of a group of men qualified to make good use of it in the country's service.





HENRY S. GRAVES

Forester of the United States, and one of the chief participants in the opening of the new laboratory at Madison

THE WORK OF THE GOVERNMENT IN FOREST PRODUCTS

By HENRY S. GRAVES, Forester of the United States

An address delivered at the opening of the Forest Products Laboratory, June 4, 1910

THE United States is now facing the problem of forest conservation which must be solved by every country some time during its history. The original American forests were unexcelled anywhere in the world. Not only did they cover a vast area, but they were characterized by trees of great age and size, and by an unusual variety of valuable species. Heretofore we have drawn chiefly upon the original supply of timber, and the bulk of the lumber used in this country to-day is still from trees over 150 years of age. In spite of the rapid rate of cutting and the destruction of forests by fire, ample supplies have been made available by the opening of new regions through the extension of railroads and through the development of logging engineering. The process, however, cannot be continued indefinitely. Already the end of the virgin supply of timber is clearly in sight, and all thoughtful men who are familiar with the conditions appreciate that there is before us a problem which very profoundly affects the welfare of the country.

The problem of forest conservation must be worked out from two standpoints; first, by securing the greatest possible economy in the utilization of forest products, and, second, by producing new supplies through forest growth.

At present, there is a great loss in the utilization of forest products, and the production of new supplies is entirely inadequate to meet the requirements of the people in the future. Within recent years great progress has been made in the protection of forests

from fire. The loss from that source has been greatly reduced, although there is still an enormous amount of destruction of young growth by fire, and in some sections fire has almost entirely prevented forest reproduction. One of the most important aims of the forestry movement has been to bring about not only the protection of standing timber from fire and other agencies, but also the replacement of forests as they are cut and the establishment of new stands of timber on denuded lands.

Forestry, however, does not stop with the growth of trees. It concerns itself equally with the disposal and utilization of the products. The two branches of forestry, forest utilization and forest production, are inseparably related. The market for products is one of the factors most controlling the selection of species to be grown and the methods of handling woodlands for forest growth. The study of forest products is, therefore, one of the most important lines of work of the Forest Service.

The fundamental purposes of the work of the Service in products are, first, to bring into use the greatest possible amount of the products of the forests with the least possible waste, and, second, to place these products to their best use. In other words, the Service aims to aid in making the material which can be obtained from the forest meet in the highest degree the real requirements of the people. This broad principle is the foundation of the work which will be done at and in connection with this laboratory.

In its work in products, the Forest Service keeps in view two objects:

First, direct aid to the various wood-using industries, and second, forest conservation in its broadest sense.

The interest, cooperation, and support given to the Service by practical men engaged in different industries is proof of the appreciation of the work in products which has been done and is projected.

The science of forestry in this country is at its very beginning. While the American species of trees are well known botanically, the study of their life-history, their behavior in the forest, and their possibilities of production has only recently made much progress. It is equally true that our knowledge of the products of the various species is still very inadequate.

The first necessity is to determine the fundamental properties of the various woods. This information is essential as a foundation for the study of the suitability of the different species for specific uses. At the present time there are many species which are little used or not used at all because of ignorance of their properties or prejudice against them. Many of the common commercial species are for the same reason confined to only a few of the possible uses. It is the aim of the Forest Service to show the possibilities of all the species and to demonstrate the uses to which each is best adapted.

The demonstrations at the laboratory to-day have illustrated many of the special lines of work and the methods of conducting the investigations. You have seen the methods of studying the fundamental physical, mechanical, and chemical properties of wood.

A further aim of the work at the laboratory is to study the methods of handling wood products so as best to adapt them to certain purposes. Studies will be carried on at the laboratory to show the behavior of the various woods under different conditions. One of the important problems is to determine the influence of different conditions of moisture on the strength, durability, and other characteristics of wood. This work will form the foundation for the investigation of the best methods of seasoning wood in order to bring the

products into the market in the most suitable condition for their various uses.

The next problem is the study of how to treat wood products so as to improve their natural qualities. One of the most important lines of work at the laboratory will be the study of the treatment of wood to prolong its life. There is required in the first place a thorough study of the various preservatives. Then follows the investigation of the methods of treating the different species with reference to their peculiar specific characteristics.

There are a multitude of problems of wood utilization, but among the most important are the investigations of the possibilities of the different species for the manufacture of paper, and the study of the by-products which can be obtained by various processes. The laboratory is especially equipped to make these investigations.

I have given special emphasis to the fundamental and scientific character of the work to be done at the laboratory. Every investigation, however, is directed to the solution of some practical problem. Many experiments are conducted at the laboratory on a commercial scale, or commercial tests are made in cooperation with private concerns. In many cases, the work at the laboratory is supplemented by extensive field experiments. Through cooperation with private companies and trade associations, the investigations will not only be brought into the most practical lines, but the results will be given an immediate application.

The branch of forest products has been established at Madison. The laboratory is the center of its work. It concerns itself, however, with the whole field of forest utilization. There are special branches of its work in the various districts of the national forests of the west, and there are two subsidiary laboratories, one in the state of Washington, and one in Colorado. It is the design to bring the work into the closest relation with all the wood-using industries. The determination of the fundamental facts and principles of wood-utilization is the first step. To secure the practical application of those

principles requires the assistance and cooperation of all those interested in them in a practical way.

There has been a most gratifying cooperation with the Forest Service by the different railroads, lumber companies, paper companies, woodworking concerns, and trade associations. I wish to take this occasion to express the appreciation of the Forest Service for this cooperation and assistance.

From the standpoint of conservation, the work of the government in forest products is of great importance. When one examines the losses in the utilization of wood products, one finds that these begin in the woods. Many species are not cut at all; often the trees left uncut deteriorate rapidly, or are blown over, or are injured in logging; frequently long tops containing a large amount of low-grade lumber are left in the woods; and many logs only partially defective remain on the ground. The cause of this seeming waste is the condition of the market. The lumberman seeks to take out only what he can dispose of at a profit. It is to his own interest to take out of the woods just as much as he can possibly utilize, because every increase in amount of marketable material removed reduces the cost of production and increases profits. The amount of waste in the woods is therefore definitely governed by market conditions. In exactly the same way it is the condition of the market which causes a great loss in the manufacture of lumber. Close utilization follows good markets.

It is the market, also, which most powerfully influences the problem of forest production. The better the market, the greater is the value of the timber; an improved market means a correspondingly increased inducement to protect the forests from fire; there is an increased value of immature and young growth; and a correspondingly greater justification for investments in holding and protecting cut-over lands for the production of new stands of timber.

The work of the Forest Service in products will have a direct influence in the long run on market conditions. The

development of new uses of wood will bring into the market species and grades not before merchantable. The uses of wood for by-products will reduce waste and enable the lumberman to use material now frequently left in the woods or wasted at the mill. The extension of the use of treated timber will enable the marketing of the less valuable species for uses now requiring the most valuable. There will thus be a constant tendency to extend the market and to decrease the loss in utilization all along the line from the stump to the manufactured product.

There are, however, other factors influencing the market which will not be directly touched by the investigations at the laboratory. These factors must not be overlooked in the consideration of the relation of the market for forest products to conservation. Problems connected with the methods of logging and manufacture of lumber, grades and sizes of lumber, rates for low-grade lumber, the car-stake question, etc., concern conservation. In some of these problems, the Forest Service can be of assistance through its work of products.

One of the most serious problems, however, in the whole realm of forest conservation is that of over-production of lumber. In some sections of the country more lumber is being manufactured than is needed. There is, in consequence, a poor market for the lower grades and a great deal of waste in the woods and at the mill. From the standpoint of conservation, the condition would not be so serious if the forests were being replaced after cutting. But the conditions which lead to waste in utilization prevent, also, the practice of forestry. There is, then, a double loss—waste of the present resources and prevention of the production of new resources.

I doubt if this situation can be met at once or by the application of any one remedy. It is clear to my mind, however, that in this case, as in other conservation problems, there must be some present public investment for the future welfare of the country. This investment will take two forms: First, an increased price of products which must

approach the cost of producing these by growth, and, second, direct investment in public forests and forestry. So far, the public has not appreciated this condition. There have been public appropriations for the administration of the federal forests, but the various states are not now making the investments necessary to solve their local problems of forestry; the general public is apparently not yet prepared to pay more for the products in order to cover the cost of conservation. One of the first necessary steps is public education regarding our resources and the conditions of their utilization. A better appreciation by the public of the conditions of forest production, logging, and manufacturing of lumber is essential to work out this phase of conservation and bring about a proper adjustment between the limited resources and the needs of the people.

I have felt justified in calling attention to this problem because it is very closely related to the work of forest products and the application of the investigations in this branch of the Service.

As I have only recently become connected with the Forest Service, I feel that I can speak without reserve in praise of the work which has been un-

dertaken. I wish especially to compliment the work of Mr. Hall, Mr. Cline, and their associates in their work of forest products. I wish at this time to express my deep appreciation of the support and cordial cooperation of President Van Hise, and other authorities of the university who have made possible the Forest Products Laboratory.

I regard the cooperation with the university of the greatest value. It is not only in the general educational work in forestry that the Forest Service will be greatly aided, but the association with the university will be very valuable in the conduct of the scientific work at the laboratory. We wish to maintain among our workers that spirit of search after truth which characterizes this great institution. The science of forestry is still in the creative stage. A great deal of the research and of the work of establishing the practice of forestry must be done by the government. To carry on this work, I consider it of the greatest importance that there be no lessening of that spirit of individual initiative, personal responsibility, and high ideals which has characterized the members of the Service under the inspiration of Gifford Pinchot.



SOME EXAMPLES OF TIMBER TESTS

THE cuts on the five succeeding pages illustrate very clearly the nature and the methods of some of the work done in one department of the forest products laboratory—that of timber tests. Machines of great simplicity, but efficiency, have been devised for determining the strength of wood under different kinds of strain.

Figure 1 shows a bridge tie of western yellow pine which was broken by the blow of a 515-pound hammer falling twenty inches.

Figure 2 shows a similar piece of timber which sustained under gradual loading a maximum load of 2,380 pounds, concentrated at two points equally distant from the center and one-third of the space apart.

Figure 3 shows a white pine packing box which sustained a maximum load of 1,370 pounds, applied at diagonally opposite corners. This box was eighteen by twenty by thirty inches in size.

Figure 4 shows the manner of testing hickory buggy spokes.

Figure 5 shows the results of torsion or twisting tests upon sticks of red gum and four commercial grades of hickory.

These tests were made some years ago, but they are typical of the work done in the section of timber tests. With the new equipment, the section will be able to do a much more comprehensive work in the future.

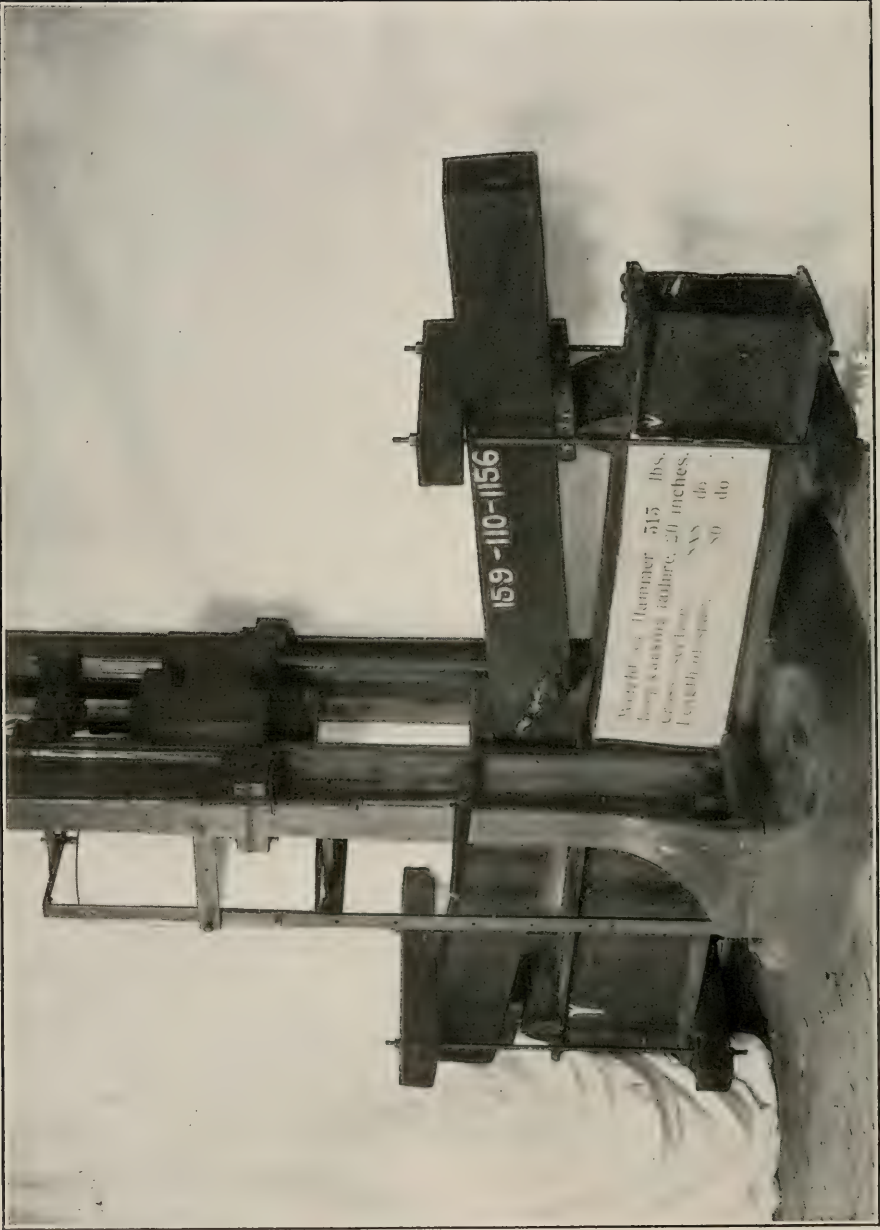


Fig. 1—Testing a yellow pine bridge tie; impact loading

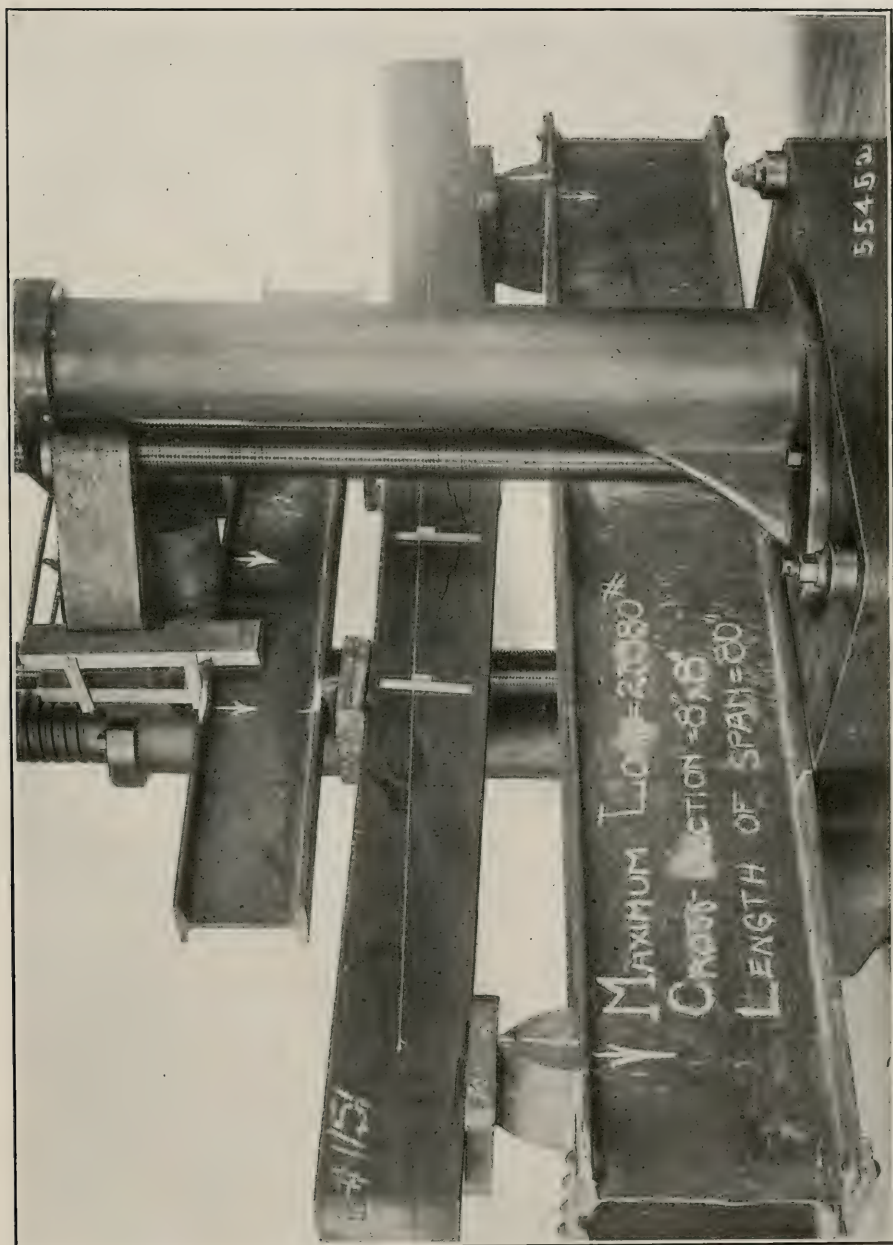


Fig. II—Testing a yellow pine bridge tie; gradual loading, load applied at third points



Fig. III—Testing a white pine picking box; gradual loading

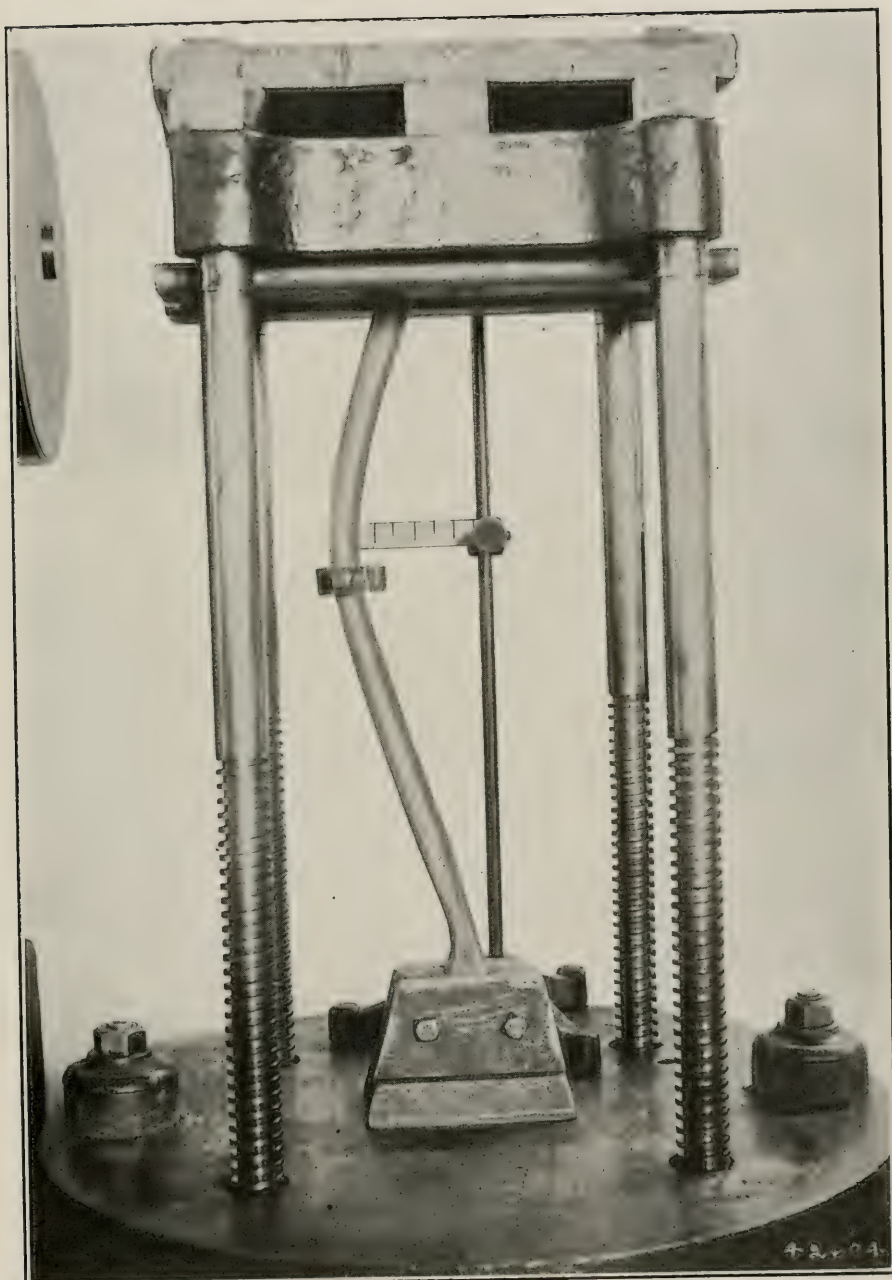


Fig. IV--Testing a hickory buggy spoke



Fig. V—Results of torsion or twisting tests upon sticks of red gum and four commercial grades of hickory

THE PAPER AND PULP INDUSTRY AND CONSERVATION

By B. R. GOGGINS

An address delivered by the author, representing the American Paper and Pulp Association at the opening of the Forest Products Laboratory, June 4, 1910

IT IS gratifying to the paper and pulp manufacturers of this country that the paper industry is specifically included within the purposes of this institution.

Wisconsin is the greatest paper-making state of the middle west, and ranks third in the Union. Its location, the extent and variety of its forest products and other natural conditions make it fairly typical of the paper-making sections of the United States and an ideal location for this Forest Products Laboratory.

Wisconsin's seventy-five mills, owned by forty-five different concerns, manufacture annually 459,000 tons of paper, 264,900 tons of groundwood pulp, 216,000 tons of sulphite pulp, or a total annual product of 939,900 tons, requiring annually for the production of such groundwood and sulphite pulps (480,900 tons), 300,000 cords, or 645,000 tons of spruce, and 540,000 cords, or 1-, 350,000 tons of hemlock.

Thirty years ago, as compared with to-day, but little paper was made or used in this country. At that time, little or no groundwood pulp was made, and no chemical pulp at all in the west. Commencing shortly after that time, groundwood pulp from poplar was made and used on a small scale, and within the next ten years, owing to its superior quality, groundwood pulp from spruce was largely used.

About twenty-five years ago, sulphite pulp came into use in a very small way, and for a number of years was made entirely from spruce; but, as this timber became scarcer, hemlock came into

use for this purpose and has since been used therefor with success.

Less than twenty-five years ago, paper-makers of Wisconsin regarded the supply of spruce in this state as inexhaustible, but it grows sparsely and mixed with other timber, and in a few years they were undeceived, and for some years past have been forced to look to Minnesota and Canada for a supply of this timber.

An important progressive step was the combined use of sulphite, manufactured from the more plentiful hemlock, with groundwood pulp from spruce. But, notwithstanding our vast forests of hemlock and spruce, it soon became apparent that without provision for new growths and use of other kinds of timber or vegetation, the supply of both hemlock and spruce would in time become exhausted. And as they have become less in quantity, their cost has greatly increased. Within the last twenty years for a considerable period the price of spruce pulp wood of the best quality, delivered f. o. b. cars at points in the Fox River Valley, Wisconsin, ranged from \$4.50 to \$5 per cord. Now, a comparatively inferior quality runs in prices from \$10 to \$11 per cord. Hemlock, then practically without value, now ranks even higher than spruce did at that time.

Thus far, the production of pulp, groundwood or sulphite, has been practically confined to spruce and hemlock. Theoretically, there is no reason why any plant of the vegetable kingdom having fiber cannot be converted into pulp suitable for the manufacture

of paper. In the timber belts of this country are many kinds of wood in great quantities, and upon its soil are annually grown to maturity many plants which, it is believed, will be used in the manufacture of paper by processes yet undiscovered. The planting and growing of new forests is already an assured fact. Thus will be brought to the paper industry an inexhaustible supply of raw material from farm and field and from forests now grown and growing and forests hereafter to be planted and grown.

A cord of spruce, weighing about 4,300 pounds, yields on the average, by present methods employed, 1,700 pounds of groundwood pulp, or thirty-nine and fifty-three one-hundredths per cent of its weight. A cord of hemlock, weighing about 5,000 pounds, yields in sulphite, 800 pounds, being further reduced in the process of converting it into paper to 727 pounds, or fourteen and fifty-four one-hundredths per cent of its weight. Therefore, in converting spruce and hemlock into paper, there is at present a direct loss in material of sixty and forty-seven one-hundredths per cent and eighty-five and forty-six one-hundredths per cent, respectively.

This illustration is sufficient to show the great loss of raw material in the manufacture of pulp and paper by the processes now known.

As yet, no successful method for producing suitable groundwood pulp from hemlock has been discovered.

What a wonderful saving in raw material there would be if a way were found of producing from hemlock groundwood pulp equal in weight and usefulness to that now derived from an equal weight of spruce! This alone would more than double the present pulp product from hemlock.

What a wonderful addition there would be to the raw material for use in paper manufacture, should ways and means be discovered for use of the many other kinds of wood, cornstalks, and the numerous grasses found and grown in plenty in this country. Wealth

is always increased to the extent that waste is prevented and new sources of supply discovered.

In this respect the paper industry is no worse off than any other. Man's ways and devices for reducing to usable form the things which nature has provided in such abundance for his happiness and comfort have usually been too crude and wasteful. He thinks seriously of efficiency and saving only when he can see the end of what he theretofore regarded as an inexhaustible supply. It has been by one competent to speak, truthfully and timely written that:

"Nature's operations are characterized by marvelous efficiency and by lavish prodigality. Man is a child of nature as to prodigality, but not as to efficiency. If it had happened the other way—if he had followed nature's lead as to efficiency, but had taken up parsimony as a distinctly human virtue—the human race would have become wealthy beyond conception." *

So, till very recent years, the people of this country, blessed with everything that goes to make a great people prosperous and happy, rested on the assumption that its mines and forests were practically inexhaustible. *They now know better, and the great problem of the day is to reduce to a minimum the waste in the present ways of converting raw materials into product fit for consumption, to bring into serviceable, economical use everything that nature produces, and to provide ways and means for the reproduction of that which has been consumed.*

Timber has, and will continue to have, a multitude of useful purposes. However, while buildings, bridges, and other structures will in increasing numbers and proportion be hereafter constructed from stone, brick, cement, iron, and other like materials, thereby lessening the claims on our forests for such purposes, resort must ever be had to the vegetable kingdom for materials out of which to make paper.

*Harrington Emerson in July, 1908, *Engineering Magazine*.

There are thus here pointedly presented to us overpowering reasons why the paper industry should be specifically included within the purposes of this great institution. And it is fitting that such purposes should include the discovery of ways and means for the production, if possible, of a suitable grade of groundwood pulp from hemlock and other kinds of wood than spruce; for the use of cheaper, more plentiful, and more quickly grown kinds of wood for use in the sulphite, soda, and sulphate processes; for the production of suitable pulps from cornstalks, the different grasses, and like vegetation grown annually; for the saving and use of mill waste from pulp and fiber manufacture; for the material increase of the amount of pulp of all kinds from the raw materials.

People engaged in the productive industries, no matter how great their inclination, have not always the leisure, means, or training necessary to work out to the best advantage methods and means for getting the most out of our natural resources. And it is because of this fact, among others, that the national government wisely here assumes one of its greatest and most beneficial functions; for the nation which most economically and beneficially uses its natural resources must longest endure in happiness and prosperity. The united harmonious labors of the government's experts and the people practically employed in the industries must necessarily be productive of the most satisfactory results, for the highest success must necessarily attend upon the union of scientific experiment with practical application.

Paper-making is an important and great industry. No other article, to my mind, has so many varied and extensive uses. It has become a necessity of everyday life and has been and must continue to be identified with the advancement of civilization. In the sense of the use of raw material from the forest, it is a new industry. It is but twenty years since the first paper was manufactured on the Wisconsin River, the present seat of a large part of the

Wisconsin production. Nine hundred ninety-six mills, representing an investment of \$350,000,000, are now engaged in the manufacture of pulp and paper in this country, yielding an annual product in value \$250,000,000. In Wisconsin alone the direct investment in the industry is about \$30,000,000, distributed in ownership among over 3,000 persons, with over 7,000 persons directly employed therein, producing annually paper in value \$23,000,000. About these mills have grown up thriving cities and villages dependent upon this industry for support. This does not take into account the thousands of persons engaged in the preparation of the wood in the forests and in transportation of the raw materials to the mills and the finished products therefrom to the market. It is safe to say that no other article in common use by the people has been furnished to them so cheaply and has increased more slowly in cost to the consumer, despite the great advance in cost of raw materials and labor.

Neither is it a decadent or dying industry in this country, and, generally speaking, never will be in the localities where it is now made.

The fact that the people of this nation must continue to have paper is, in itself, a reason why it should never become a decadent industry in this country. Combined with such necessity is the great economic reason that it requires great power and great quantities of raw materials in fairly close association with each other. In Wisconsin alone there is estimated to be 160,000 horse-power of water-power employed in this industry. This country had at the start great areas of the finest forests, including about all the kinds of timber indigenous to our latitude. While its spruce is much depleted, it yet has great quantities of hemlock. Its still greater quantities of jack pine and other kinds of timber and other mentioned probable sources of supply, it is confidently believed will, at no distant day, be made available to this industry. It has great stretches of land which can and will most profitably be, and are now

to some extent being devoted to a new growth of timber.

Some have thought that the paper industry must shortly die here and be transported to Canada. This is a mistake. The quantity of timber there available for the purpose is less than some time ago supposed, and its water-powers, on account of the greater cold, are less efficient than our own. Its supply of timber would and will, unless renewed by the very means by which our supply can and will be perpetuated, soon be exhausted, and what then? The necessary reestablishment of the industry in our own country. With our water-power in such large amount and improving efficiency, and our present supply of raw materials and facilities for the production of more, I believe that this important industry will forever remain with us and continue to supply paper to this country at less cost than if the industry were transferred to some other land. Tariffs have been considered necessary to the establishment of industries for the production of things of prime necessity to the people. The continuance of such tariffs is often more necessary to the con-

tinuance of the industry thus established. But more important for the permanent welfare of the people is the direct, energetic, and intelligent application by the government of scientific thought and effort to the discovery and application of ways and means by which to reduce to the minimum loss in raw materials in the process of converting them into forms suitable for use, the discovery of new sources of supply, and to the replacement of what has been consumed by new growths where possible; for thereby such industries, however established, dependent on such raw materials, are perpetuated to the everlasting benefit of the people. For such purpose, in one department, is this institution established and to-day dedicated. The principle of conservation of natural resources can have no truer or more beneficial application. In this work, no class of producers feel and have a greater interest than the paper and pulp manufacturers of the whole United States. Their loyal, active support and cooperation will never be found wanting in this important undertaking.



TENNESSEE RIVER IMPROVEMENT AND SEDIMENTATION

A reply to the testimony of Capt. Edward N. Johnston, U. S. Army, before the House Committee on Agriculture, on March 2, 1910, when considering the Weeks Bill

By L. C. GLENN, Ph.D., Professor of Geology, Vanderbilt University

AT SEVERAL hearings in recent years before the Committee on Agriculture of the House of Representatives, the writer has given testimony as to the harmful effect the material eroded from the steep head-water mountain slopes of the Tennessee River Basin is to-day having on the navigable portion of that stream.

At the hearing on March 2, 1910, in response to an invitation extended by the committee to the army engineer's office, for information on the same subject, Capt. Edward N. Johnston appeared as the representative of that office. After being questioned by the chairman to develop for the committee the fact that he was "familiar with the reports and the literature on the subject"—not only published but unpublished—Captain Johnston said, in beginning, that there had developed among the engineers of the corps "a feeling of irritation at the fact that certain parties interested in forests, or others, have deemed it necessary to criticise the methods which have been followed up to the present time in the improvement of streams by the engineer department. Our hair bristled up, perhaps quite naturally, at some of these criticisms, and also because we feel that this committee has been furnished, probably unintentionally, with a considerable amount of misinformation on these subjects."

He then proceeds to quote at such length from the writer's testimony before the committee on January 30, 1908, that there can be no doubt as to one, at least, of those he thinks responsible

for this misinformation. His first quotation is as follows:

I will take the Tennessee River. It is the largest and most important one, and it is a fair type of the rest of them. At Knoxville, Tenn., the head of navigation on the river, 650 miles above its mouth, I found a government fleet there—not one or two boats, but a fleet—engaged in dredging the channel and keeping it navigable. They dredge on a bar this summer, and they go back next summer and dredge the same bar. It fills up as fast as it is dredged out, and it is practically an unending work. They are receiving the effects of the erosion of the steep mountain slopes. They are helpless.

* * * * *

The natural fill becomes concentrated along the side of the island, and it is there that bars begin forming, and it is there that the United States Army engineers must step in and begin with their dams and locks and spend millions of dollars in improvement.

He proceeds to refute the statements as to the importance of sand and gravel bars in the river, and tries to make it appear that the great majority of the obstructions down to Chattanooga are hard rock ledges. In order to do this he quotes from an old report of an examination made by Lieut.-Col. S. H. Long, in 1830—eighty years ago. If Captain Johnston is at all familiar with the subject on which he was testifying as the official representative of his department, he would know that one of the essential features of the contention of the advocates of forestry is that, as a result of the clearing of forests on steep slopes and the consequent increased

erosion, sedimentation has become much

more active within recent years, and that these changes have all occurred long since 1830. When his attention was called to this point by a member of the committee, Captain Johnston replied that he had no argument to make. Very naturally; there was none to make. An examination of this same upper section of the river was made by army engineers in 1893, and the report was published, and while this is sixty-three years later, even it does not describe present conditions as the annual reports of the army engineers in the last few years give them. If Captain Johnston is as familiar with the published reports of his office as it is fair to presume him to be, and as the committee was given to believe at the outset of his testimony, why did he dig up an old 1830 description of the river and try to have the committee take it as an accurate description of present-day conditions? Why did he not at least come down sixty-three years later and quote from the 1893 report? Or, better still, why did he not quote from very recent annual reports—for much change has occurred since 1893—if he desired to really enlighten the committee on present-day conditions there?

Let us, however, look somewhat closely at the testimony he does offer. He begins his quotation from the 1830 report with the following:

No. 2. Lyons Shoals. These shoals are created by an extensive rocky bar, etc.

It will be remembered that he is minimizing the gravel and loose material, and magnifying the solid rock ledges. If we are curious why he did not begin with No. 1, instead of No. 2, and turn to the 1830 report, printed in 1875 as House Exec. Doc., No. 167, Forty-third Congress, Second Session, we will read:

No. 1. Knoxville Shoals. * * * They are occasioned by a gravelly bar extending quite across the river. * * *

This was opposed to the view he desired to impress upon the committee, and so was very conveniently left out.

After quoting No. 2 as far as is given above, he adds: "I will not go on with the rest of that." If our curiosity is again aroused as to why he did not go on, and we read on, we find a second bar mentioned under that heading, and then the statement: "The obstructions on both [*i. e.*, bars] consist of rocks at the bottom, mostly loose. * * * That is, the bars were mostly of loose boulders, but Captain Johnston quoted just far enough to leave the opposite impression that they were firm rock ledges.

Back in 1830, although there were some gravel bars on the upper river, they were doubtless stable, and remained so until within very recent years, when old ones began growing and new ones forming, as may be seen by reference to the recent annual reports of the army engineers. In 1830 most of the obstructions probably were rock ledges, and much of the money spent on the river in open channel work has been for building training walls and dams, but in recent years an ever-increasing proportion has been spent in dredging, and three dredging plants are now maintained on the river, one for each of its three sections. As to the magnitude of the gravel bars on the upper river, the 1893 report describes a number that vary in length from 2,500 to 7,000 feet each, and a number of gravel bars with occasional ledges of rock that run up to 15,000 or 20,000 feet each in length. Captain Johnston told nothing of these and did not quote from p. 1705 of the 1908 report that the dredge on the upper river had been doing such heavy digging that after only a few years' use it had to be entirely rebuilt.

As to the middle section of the river, he next quotes from the report of a survey of the Tennessee River from Scott Point to Lock A, made in 1901, that "there is little or no bar-making material traveling downward in the river bed," and "that there is little or no moving material in the bed of the stream." He failed to tell the committee that this same report, in direct conflict with the statements he did quote from it, shows that, in this distance of

159 miles, of the portions of less than five feet depth at mean low water, 81,850 feet, measured along the line of the channel, have a sand and gravel bottom, 77,800 feet are of gravel and rock and only 27,900 feet are rock. Nor did he say that in this section between Guntersville and Hobbs Island there are a number of gravel bars on which the 1903 report on p. 1595 says shoaling is occurring and from which over 200,000 cubic yards of gravel have been removed in recent years. Captain Johnston also fails to quote from p. 2441 of the 1901 report concerning this same section in which the committee had been assured there was no loose, moving, bar making material, that "at the entrance to both divisions of the [Muscle Shoals] canal also a large amount of silt accumulates at every high water, and constant dredging therefore is required to keep the canal cleared." And all of this in a section that Captain Johnston would have the committee believe had no loose material in the bed of the river!

Captain Johnston told the committee nothing whatever of the lower section of the river, 226 miles in length, where, as in all normal rivers, because of its slight slope, more gravel and sand lodge than in the upper reaches. Had it not been so thoroughly out of harmony with the idea he was trying to impress on the committee, he might have quoted from pp. 1712-13 of the engineer report of 1908 that some of the bars there persistently reform and require dredging every year or two, or from p. 566 of the same report, that while in 1896 there were forty-nine shoals—all but two or three being of gravel—in this lower section, several more have since developed; that 1,127,660 cubic yards of sand and gravel had been removed at about thirty-one of these localities in the last few years; and that as to the results of dredging, the best they themselves can say is that results appear to be fairly permanent at about two-thirds of the places improved. None of this fitted into his picture of a river practically free from sand and gravel, and so was most conveniently omitted.

Captain Johnston continues quoting from the writer's testimony in 1908 as follows:

I have here a table, which I will not read, giving the streams in the south that are navigable, the length of navigation in each one, and the total expenditures of the United States government in 1790 to 1907, inclusive. On that Tennessee River over \$8,000,000 have been spent. Under present conditions, there is no chance to permanently improve that navigable channel, because of the incessant inrush of the sand and gravel. If the material is checked before it ever starts, up in the mountains, and kept there by keeping forests on those steep slopes that ought never to be cleared, then the necessity for this constant dredging would be greatly decreased, or perhaps obviated entirely. Merely as a business proposition, is it better to bale out sand forever from the stream and take no means for preventing it from getting in there, or is it better to go to the root of the trouble and hold the sand where it was made, on those steep mountain slopes, and keep it from ever getting down into navigable streams?

He then states that only \$1,700,000 of this total of \$8,000,000 has been spent in open river work, and contrasts it with—to quote in his own words—"Professor Glenn's inference of over \$8,000,000 having been wasted." At this point the chairman of the committee interrupted and added: "The statement was made here that it had cost \$8,000,000 to dig out of the Tennessee River the detritus that had washed down from the slopes." No such statement was made by the writer. His statement was that the *total expenditure* had been over \$8,000,000, and in the same testimony the distinct statement had been made and was included in the first quotation made by Captain Johnston, as given above, that army engineers had to step in and begin with their *dams and locks and spend millions in improvement*. This distinctly recognizes lock and dam work on the Tennessee as costing millions. If the river is kept free from sandbars, these millions spent on locks and dams may not be wasted, but if the bars are not kept dredged out, then these millions are wasted, for no matter how many locks and dams there are, a single sandbar across a river will render it useless for traffic just as surely as a

single wreck will block a railroad, or a single break deaden a telegraph line. The sand and gravel, like the stream, flow down forever.

The writer did not say that the army engineers were hopeless and had thrown up their hands in disgust, as Captain Johnston attributed to him in his testimony. He did say, and repeats, that while they may dredge out the sand, they are helpless to check or prevent its incessant inrush from the eroding mountains. Nor is this any criticism of the engineers. That the sand and gravel are constantly swept down to them from the headwaters is no more a reflection on them than to say that the water that brings it is being constantly carried down the same course to them. They are not hopeless or disgusted, but will dig and work as long as appropriations are forthcoming, and the history of their plans for improving the upper Tennessee River shows that their estimates to secure a three-foot channel at mean low water have steadily mounted for years, and that they are far from being ready to quit. In 1871 the estimate was \$175,000; in 1877, \$225,000; in 1884, \$300,000; in 1891, \$340,000; in 1894, \$650,000, in addition to the \$296,000 already spent; in 1907, \$1,080,000, in addition to the \$629,152.85 already spent, and in 1910 the writer understands that in a report on the upper river, recently submitted but not yet published, the plan of open channel work adopted years ago with the assurance that this upper section of the river was admirably suited to it, is now regarded as impracticable, and it is proposed to substitute in certain

parts of it locks and dams. The writer does not yet know what the estimates for this work now are, but lock and dam work is always costly, and it is safe to predict that, like the tariff, this last revision is like all of its predecessors, ever upward. They have not thrown up their hands, but constantly raise their estimates, instead.

It is probable that we at last have a plan of improvement that is adequate to meet present conditions, and that the increased estimate of cost is only what we may naturally expect to pay because of these conditions.

Captain Johnston is throughout his testimony, by his convenient omissions and garbled quotations, pleading a special cause, rather than presenting actual conditions fully and fairly. The many annual and special reports of the army engineers on the Tennessee River give too much information as to real conditions on it to make it necessary to draw on one's personal knowledge of the river to refute Captain Johnston's one-sided statements. It has, instead, been thought best to refute the army engineer testimony as cited Captain Johnston's out of the mouths of the army engineers themselves.

The writer would heartily agree with Captain Johnston, after finding it so necessary to correct and supplement his quotations, that the committee has been furnished "with a considerable amount of misinformation" on the subject, and he also agrees with the member of the committee who says, on page 158 of the report on the hearings of 1910, that "it is best for us to know the truth."



EDITORIAL

What Is Conservation?

IN VIEW of the prominent place that the issue which has been named conservation has occupied in the press of the country for some time, it seems unnecessary to ask the question at the heading of this article. It is, nevertheless, a fact that conservation is honestly misunderstood by many people, and that on the part of some others there is a persistent and reprehensible attempt to misrepresent its whole spirit and purpose. At frequent intervals there come, generally from the west, although the western complainants have eastern allies among the advocates of special privilege, sharp attacks on the advocates of conservation. These attacks take the form of newspaper editorials, of speeches addressed to public gatherings, of complaints by individuals who have found some of their privileges curtailed by the exercise of the functions of government in the public domain, or perhaps of handsomely printed circulars from banking houses setting forth the evils of the conservation policy and appealing to the patriotism of the people to permit the development of the country. Often they take the subtler and more dangerous form of undermining through political and official channels the great enterprises for real national development. The attempt is made to make it appear that the conservation of natural resources is a sentimental idea designed for the benefit of future generations by the sacrifice of the interests of the present. Our forests, our water powers, our minerals, are given to us, say these critics, not to bottle up and preserve for an indefinite future. They argue that the present generation is just as important as the next and those that will follow.

This is plausible. We have no doubt that many of those who advance these

arguments sincerely believe in the justice and patriotism of their position. Neither have we any doubt that many of those who use this argument use it deliberately to disguise plans for the personal exploitation of the property of the people.

The principle of conservation has been so often clearly stated that this misinterpretation by intelligent men is incomprehensible. Must it be repeated over and over again that conservation, in its special sense as now used among us to designate a definite national policy, means use, wise use, determined by the actual needs of the people; use without waste, and with perpetuation where that is possible, as in the case of forests; and use of the natural resources of the earth, the gifts of nature for the greatest good of the greatest number. Conservation has no idea of restricting use. It does exist for cutting out waste. It denies the primary right of a few individuals to use for their private and personal gain the resources of the people. That is simple and that is the reason for all this misrepresentation. The galled jade winces.

It is characteristic of the exploiters to represent themselves true benefactors, the real friends of the people. Personal exploitation of the public property always shelters itself behind the guise of "promoting the public good," "the development of the country," "adding to the country's wealth," and many people believe the claim. We all believed it a few years ago until we began to study the forestry question, which has taught us many things about our national domain.

Mr. Garfield stated the issue clearly, when he said in reply to a question while he was on the stand in the Pinchot-Ballinger inquiry, "We believe in present day use of the resources so

far as they are needed, but we do not believe in unregulated and unrestricted monopoly." That we understand to be the whole question in a nutshell.

Let us look at some concrete examples. In the west were millions of acres of virgin forest, growing where, for the most part, only forests would grow. A few lumbermen might take these lands up and under some of the acts which were passed to encourage the pioneer, cut and market the timber as fast as practicable, accumulate swollen fortunes, and leave the land bare and non-productive and the water courses unprotected. This would deprive the present generation of much of its working material and it would entail upon those who come after us great deprivation. Millions would have lost their share in the national birthright that a few might secure abundant profits. This is what was happening when we began to reserve national forest land and otherwise to safeguard our western possessions. And when certain western statesmen wax eloquent over the wrongs of the poor western settler, it is worth inquiring whether there is not behind the poor western settler a principal who is anything but poor and who is angered at seeing his opportunity for looting the rich public domain taken away. This is not theory or inference. It has been abundantly proved, even as to some of the "men higher up."

Again, the United States, not a syndicate of its citizens, bought Alaska, taking the risk of what seemed to almost every one except William H. Seward a decidedly speculative investment. Up there we, the people of the United States, own vast beds of excellent coal which we have been informed on good authority can be got out for about \$2 a ton. Government vessels on the Pacific coast, within easy reach of the Alaska supply, use tens of thousands of tons yearly, and pay a large price for it. Why should we turn over these Alaska coal fields for a song to the Guggenheims or any other combination in order that they may turn around and sell to us, the United States,

for \$12 a ton, coal that cost them \$2 a ton to mine and an insignificant sum to own? That is not development of the national property. That is swindling the nation out of its own.

This is a simple business question for the people of the United States, and it is the simple business aspect of some of these questions that we who demand proper conservation of natural resources are asking consideration for. These questions are just as important to the present generation as to the next. If we entail our national property, we are just so much the poorer, even if a few fortunate gentlemen are a few millions richer. Profits made by individuals through this kind of manipulation are not legitimate, for they are unearned and are taken from the real owners. The legitimate interest of individuals may be easily provided for without throwing away the people's birthright for a mess of pottage.

This is not socialism. It is hard-headed, everyday business fact, and it is a part of the policy of conservation.

The individual complaints of genuine settlers on the public land who wish to secure cultivable lands which are included within national forest areas, are no proper part of this misrepresentation and attack on conservation. They are merely incidents in the development of the national property, although they are used by the assailants of conservation to make arguments in opposition to it. These cases, which are sometimes hardships for deserving individuals, can be and will be adjusted in due course of time. It is unfortunate that the public business cannot be transacted more simply and directly and more effectively, and that such cases cannot be promptly and equitably disposed of; but we have not yet succeeded in freeing the government machinery of its entanglement of red tape. This, however, is no argument against conservation, which is a vital principle of the nation's life. Conservation will not withhold from settlement and development by genuine settlers any cultivable land. On the contrary, the development of the agriculture of the country

to its fullest extent, the maintenance of soil fertility and its improvement wherever possible, are essential parts of the conservation doctrine.

Conservation is not a national policy only. A Michigan paper recently made the remark: "There is not a state, a county, nor a city that isn't saving at the 'spigot and wasting at the bung-hole.'" The old idea that any man may do as he pleases with what he calls his own needs revision. Every man's rights are limited and restricted by the rights of all others." Here is the fundamental principle of the whole conservation movement, and it is something that we must learn. It is irrelevant to make pathetic appeals in behalf of the pioneer. He should have a square deal in every respect, but the American pioneer has always shown himself capable of taking care of his own interests. The question of society to-day is a complex and difficult one and we must take into consideration the interests of the millions of people for whom these natural resources must be used if they are to continue to live on this earth in peace, happiness, and prosperity.

The Reply of Professor Glenn

AT THE hearing on the Weeks bill before the committee on agriculture this year one of the most important testimonies that has ever been given in behalf of the maintenance of the Southern Appalachian forests for the protection of streamflow was that presented by Prof. L. C. Glenn of Vanderbilt University. Mr. Glenn testified from the standpoint of a geologist, and of one who had wide experience and who had made special field studies in the Southern Appalachians. At the same hearing, by invitation of the committee, certain officers of the army engineer corps appeared. Some of their testimony contained admissions very helpful to the cause of the proponents of the bill. Some of it was along lines less favorable, such as have been made familiar through the published arguments of Lieutenant Colonel Chittenden,

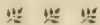
of the same corps. Some of them were irrelevant, because they related to conditions far removed from the Appalachian area and very dissimilar to the mountain conditions. The last of these officers to testify was Capt. Edward N. Johnston. Captain Johnston was placed in a very difficult position. He was frankly put forward to defend his corps, by citations from their own documents and reports, against assumed criticisms of their river work.

It seems to us that this voluntarily defensive attitude showed an undue sensitiveness. The claims of the advocates of forest preservation that such preservation would go a long way to protect the streams from the sedimentation which the engineer corps is constantly called upon to fight, does not imply a criticism of the corps for the excellent work that it has done in its own way. The corps is not a forest service, and its great mistake has been in assuming certain things in regard to the effect of forests which are not in accord with the experience of a large body of civilian engineers and foresters, here and abroad, who have studied the question with more thoroughness than any of our army engineers has ever claimed for himself. However, this was the purpose for which Captain Johnston appeared, and he disclaimed, with engaging candor, any desire to attack the proposition before the committee, or to be drawn into any discussion of it. This is where the difficulty and delicacy of his position developed. The question before the committee had become an eminently controversial one, and it was next to impossible for any one to appear while that was under discussion before the committee without being drawn more or less into the controversy.

Thus it happened that Captain Johnston's testimony was not simply a documentary defense of the engineer corps, but an attack upon the testimony of some of the witnesses who had appeared in behalf of the Weeks bill, and particularly of Professor Glenn. We felt while the hearing was in progress that this criticism of Professor Glenn in his absence involved a measure of

unfairness, as it challenged directly the accuracy of his statements. We also felt that Captain Johnston's testimony unintentionally, as we fully believe, was not complete, and to the extent of its incompleteness did not fairly represent the case. We even think that he did not fairly represent his own corps, for the reports of the engineer officers are always fair, very often full and enlightening, and they contained much information which Captain Johnston, either through lack of time or for some other reason, did not give in his citations to the committee.

We have, therefore, invited Professor Glenn, after a perusal of the testimony as preserved in the minutes of the hearing, to make such reply as he chose to Captain Johnston, both on his own behalf as a witness, and on behalf of the cause that he represented, so far as it was involved in the points of the testimony. This reply is published in the present number of AMERICAN FORESTRY. We believe that our readers will find it an interesting and important addition to the discussion to which we have already given much space, but no more than its importance deserves. Professor Glenn's reply is a compact citation of facts and figures bearing directly upon the points at issue. It is not published in any spirit of hostility or of criticism of the engineer corps, for which we have the greatest respect and admiration, or of the able and courteous officer who spoke for the corps, and to whom it is a reply. We believe, however, that the questions involved are of too much importance to be settled upon the basis of the prejudices or *esprit du corps* of any body, but that all the interests concerned will be best served by a fair and full discussion and a knowledge of all the facts.



The Proposed Morton Memorial

THERE has been introduced in the Senate and referred to the committee on agriculture and forestry, a bill to promote the science and practice of forestry by the establishment of the Morton Institution of Agriculture

and Forestry as a memorial to the late J. Sterling Morton, former Secretary of Agriculture. This bill, as its first section sets forth, is for the purpose of aiding in the advancement of the science and practice of forestry, including tree planting and tree culture among the people of the several states, by furnishing to students and teachers of said subjects adequate facilities for study and scientific research, as well as for experimental tree culture. A prominent feature of the plan is a museum for the reception of specimens, models, and other illustrative material. The bill also provides that the institution shall be located at or near the former home of Mr. Morton, in Nebraska City, Nebr.

The institution is to be under the control of the Secretary of Agriculture, who is to secure the site and erect the buildings, at a cost of not exceeding \$250,000, these buildings to be of sufficient size for the carrying on of the work of such institution and for the reception and arrangement of specimens, pictures, maps, charts, instruments, and models, showing the uses of wood and all products of the forest, together with suitable rooms for a laboratory, lecture room, chemical appliances and equipment.

The institution is to be in charge of a director whose salary will be \$6,000 annually, and other teachers, lecturers, instructors, and assistants are to be appointed by the Secretary of Agriculture as the needs of the institution require. It is further provided that the specimens, maps, pictures, charts, instruments, models, literature, chemical and laboratory equipment now in the custody of the Department of Agriculture, which the Secretary shall see fit to place in the new institution, shall be delivered to the director thereof. The institution is to be open at all times, free of tuition, to teachers and students of state agricultural colleges and to persons in the service of the government of the United States, and all others interested in the study of forestry for study and research under proper regulations.

This is an interesting project, and has much to commend it, but the measure as introduced has grave defects and should not be passed without material amendment.

In the first place, the location at Nebraska City is a decided objection to the bill. This is not a desirable location for a great, national institution for the benefit of the whole country. It is proposed to put this institution in charge of a director whose salary is larger than that of the forester of the United States, and such an institution so officered and containing the most valuable material which has been accumulated by the Forest Service and the Department of Agriculture, should either be at the nation's capital or at some center where it will be easily accessible. This is not true of the location proposed by the bill. The only reason that can be adduced in favor of the Nebraska location is the purely sentimental one, that it was the home of Mr. Morton, and this should not in the least control action in the location of so important a national institution, which would have a practical work to do. The honor to Mr. Morton in establishing and naming for him this institution would be sufficient. It is not necessary that it be established in his home town. It is desirable that the salary of the director of such an institution should be sufficient to command the highest grade of scientific attainment, but that the director of this proposed forest school should have a salary greater than that of the forester of the United States, under whom is the administration of all our great forest domain and the working out of the many problems connected with the development of forestry in the United States, would be unreasonable and unjust in the highest degree. The position of the latter official requires the highest grade of administrative ability as well as scientific attainments equal to those required by the director of the proposed institution.

The proposed removal to the new institution would practically remove from the capital the headquarters of the

United States Forest Service, because its offices would naturally have to follow its material. This goes back to the first objection made. Of course, if the proposed institution were located in Washington, as it certainly should be, the objection would not hold.

If the bill should be amended to remedy these defects, to establish the institution in Washington, to make it the headquarters and scientific center of the Forest Service, and to place its director in proper relation to the forester, we believe it would be productive of great good and we should give it cordial approval.



The East and Irrigation

A RECENT letter referring to the hostility of the east to irrigation projects and to the arm-chair critics of the eastern section of the country who fear that the reclaiming of the western lands will introduce dangerous competition with eastern farming communities, calls for a suggestion that it is a mistake to suppose that there is any general hostility in the east to the reclamation of the arid lands of the west. Such opposition as there is has been largely stimulated by the western enemies of national irrigation, who, though few in number, have sometimes been abnormally active. It may be remembered by those who participated in the movement to secure irrigation legislation, that the support of the east, through its newspapers, through the good will of its people, and finally through the very necessary votes of its representatives, was freely accorded, and the east as a whole has always supported the reclamation work, believing that the development of the west was a development of the United States. We have frequently had occasion to note a lack of reciprocity of this sentiment on the part of the west. Looking at the subject from a national point of view, as AMERICAN FORESTRY does, we can only suggest that the very best thing for the people of both sections is to become acquainted with each other

and with the different parts of our great country, to know their mutual needs, and to drop sectional jealousy and rivalry and consider national development from a national standpoint. The only competition should be a competition to see which section will do most by its own energy and ability for the common advancement. There is need enough for all the land in the United States to support the people who will be living here within the coming century. Widespread intensive cultivation of all lands that can be made available for that purpose, and the growing of forests, for wood supply and protection of springs and streams, on all non-agricultural lands are the means by which alone the future welfare of the country can be maintained.



Our Spendthrift Reputation

THE *Montreal Star* throws a sidelight upon Canadian relations with the United States in an article on reciprocity and conservation. Referring to negotiations said to be progressing favorably between the dominion government and Belgium and Italy for trade agreements, the *Star* says frankly that the advantages of trade with the United States are obvious because of the proximity of the two countries, their mutual trade needs, and the nearness of markets. It concedes that immediate gain to Canada is likely to be greater from trade with the United States, but it turns from this aspect of the case to consider the advantages of trade with Belgium and Italy, which it regards as none the less important for being less obvious. It notes the fact that "immediate trade gain and the welfare of the Dominion may be two very different things." And here is the interesting point of the argument to us on the south of the Canada line:

One of the outstanding needs of Canada is capital for the development of her resources. We are likely to obtain that capital from countries with whom we do a large trade. The capitalist will bring with him the method of development to which he is accustomed in his own land. The American

capitalist has wasted his own resources and he is not likely to conserve ours. The European capitalist—the capitalist of Belgium, of Italy, and in a high degree of Germany—has learned well the lesson of conservation. If we can secure the development of our resources by European capitalists, we will be likely to get a development which will guard the interests of future generations and enrich instead of impoverishing the country. If we give the American free scope, he is likely to land us where he has already landed his own nation. These are strong and far-reaching reasons why we will do well to encourage the European trader to come among us and bring in his wake the European capitalist.

Does this argument seem overdrawn? It must be remembered that Canada views questions sometimes in a large way and looks deeply into things for causes and effects. It has often happened that her policy has been directed by visions of imperial development, and we know that on the subject of conservation, while Canada may not be talking as much as the United States, she is taking positive action in many directions, notably in that of forest protection.

The viewpoint of the *Star* is especially significant in its exposition of the fact that we are looked upon from outside as an extravagantly wasteful people whose methods cannot be trusted. Of course, we are disposed to reply with a loud and patriotic flourish, accompanied by the eagle and the flag. But perhaps it will be more profitable to sit down quietly and consider the reasons for our neighbor's opinion of us and its probable effect upon our standing as a nation.



Protection from the Canadian Side

IN THE last number of the *Canada Lumberman*, James Innes of Chatham, a prominent cooperage manufacturer of the dominion, makes an argument for the protection of the cooperage industry in Canada on the ground that it is in bad condition and cannot recover without the assistance of the government. Curiously enough, this familiar argument is directed against cheap labor in the United States. The

Lumberman, in its editorial comment on the article of Mr. Innes, refers to the fact that foreign staves made from southern pine by negro labor can be sold in Ontario, which they enter free of duty, at prices which prohibit the manufacture of staves in Canada. This condition was brought about by the decision of the customs department that staves were lumber and entitled to free entry into Canada.

Further discussing conditions in this country, our contemporary says that the negro laborers live on wages which would not enable the Canadian to feed himself decently. How much this reminds us of the argument in regard to protection of our products against the pauper labor of Europe.

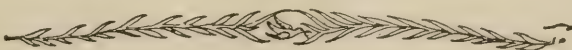
The *Canada Lumberman* has another article discussing reciprocal trade relations with the United States and expressing the opinion that there will be much less interest than heretofore among Canadians in reciprocity with the United States. The recent approach of the United States in this matter is treated as being of very little interest to Canada. The *Lumberman* remarks that Canada has been selling her goods in foreign markets against the competition of every nation and has been selling them to Englishmen in many parts of the world. The emphatic statement is made that Canada does not need reciprocity to-day, that she needs instead caution against too easy access to her home markets for the products of the United States. "There is no feeling of prejudice," says the *Lumberman*, "against the people of the United States in Canada, but there is a well founded belief that United States goods are produced in too many instances under economic conditions which are not satisfactory to Canadian ideals, and that, therefore, unless similar ideals are to be introduced into Canada, these goods must be prevented from flooding our markets."

Having said this upon the general question of reciprocity, the *Lumberman* goes on to take up the question in its relation to the conservation of the natural resources of Canada, presenting the view which we have already cited in AMERICAN FORESTRY that the protection of Canada and her interests in her natural resources, and especially in her forests, requires great caution in dealing with the United States. It says that it is a question even to-day whether Canada would not be better off if it sold less lumber in this country and made more certain of a continuous supply for its own needs. The closing paragraphs of the article are extremely interesting, and we quote them in full:

In the United States the political situation is marching rapidly toward something which looks like a tariff revolution. The west is feeling the size of its muscles and is training seriously for a tussle with the east on the question of protection. The east is attempting to improve its position by various methods, not the least interesting being the proposed reciprocity negotiations with Canada, bearing promise of some tariff rearrangements which will be acceptable to the whole country, and appear in the light of a fulfilment of recent anti-election pledges of cheaper goods for the consumers of the important necessities of life.

If Canadians understand their own welfare now as thoroughly as they have in the past, the hopes of the Republicans in the United States will not be greatly gratified by reciprocal trade arrangements. Canadian sentiment is growing rapidly against it, and in regard to lumber, which will be one of the storm centers of discussion, there seems to be no question that Canadians already look upon freer access to United States markets as something of a gold brick. The immediate future, therefore, is full of interest and importance to the people of both countries and events are sure to be followed by Canadians with a watchful eye.

In discussions of questions of the forests and their protection, we generally look at our own side of the case. It is interesting, sometimes, to have the light turned upon the "other fellow's" point of view, and for this reason we cite the article which we have reviewed.



NATIONAL FOREST WORK

Boundary Changes in National Forests

The work of revising the boundaries of the national forests continues: The President has signed a proclamation eliminating 94,290 acres from the Las Animas National Forest and 5,675 acres from the San Isabel National Forest, Colorado. The proclamation also provides that the two forests shall be consolidated and known as the San Isabel National Forest. The entire area will be administered by the supervisor stationed at Westcliffe, and the supervisor's office at La Veta will be discontinued, the Las Animas division being administered by a ranger under the direction of the Westcliffe office.

Much of the land eliminated has already passed into private ownership. The rest is for the most part open parks and scrub oak land chiefly valuable for grazing, though a comparatively small portion is suitable for agriculture. The small proportion of the eliminated area that has a forest growth has been cut over and in addition extensive burns have occurred. These burns are restocking with yellow pine, but it is very scattering, and the percentage of public land is so small that further administration as a part of the national forest is considered impracticable.

The eliminations from the San Isabel forest consist of numerous small areas scattered along the exterior boundary. The area released from the Las Animas comprises a strip of land for the most part from three to six miles in width along the northeast, east, and southeast boundaries.

The eliminations are the outcome of detailed field examinations made by the Forest Service during the summer of 1909 under the direction of the Secretary of Agriculture. The unappropriated areas will be restored to settlement and entry after having been advertised in the local papers by the Secretary of the Interior.

The President has also signed a proclamation eliminating 203,635 acres from the Wallowa National Forest, Oregon. The elimination is the result of a careful examination during the past summer, which disclosed the fact that the areas now eliminated were either open grass land with very little timber or timbered areas so largely alienated that further administration by the Forest Service was considered impracticable. The lands released are not needed for watershed protec-

tion, and are not considered to be chiefly valuable for national forest purposes.

Some sections are transferred from the Wallowa to the Wenaha Forest, the area having been isolated from the Wallowa by the large eliminations. The unappropriated portions of the areas eliminated by this proclamation will be restored to settlement and entry after having been advertised in the local papers by the Secretary of the Interior.

A third presidential proclamation adds to the Datil National Forest, in New Mexico, 183,091 acres, and eliminates 95,178 acres. These changes are also the result of the recent field examination. Three areas are added to the eastern division of the forest, and one to the western. The largest addition to the eastern division brings within the forest the Bear Mountains and surrounding country, lying east of the old boundary. On the north, a strip containing eighteen sections of the southern watershed of Alamosita Creek is added. The new boundary practically coincides with the foot of a line of bluffs along the creek, and is therefore advantageous from an administrative standpoint. The third addition to the eastern division is five sections of land at its southwestern corner, west of Crosby Mountain.

The addition to the western division takes in the Luera Mountains on the east. The only large elimination is from the southern end of the Magdalena division. Smaller eliminations and additions alter the boundaries of all the divisions at various points.

The additions contain good growths of merchantable saw timber, totaling about 30,000,000 board feet, besides a large amount of cordwood. The soil and topography make forest protection necessary in many parts. It appears that overgrazing of the lands now added has seriously hampered the growth of reproduction. The greater part of the Datil National Forest is rough and mountainous, but is particularly adapted to grazing. There are many deep, narrow canyons, with large mesas between them sloping off toward the river courses. The water is important for irrigation on the level country beyond the forest limits. The eliminations consist almost wholly of open grazing lands, where no watershed protection is necessary. There is also eliminated the little mining camp of Fluorine, located on the south half of Section 34. The lands eliminated from this forest will also be promptly restored to settlement and entry in the usual manner.

The President has also signed proclamations eliminating from the Gunnison National Forest, Colorado, 11,195 acres; from the Cochetopa Forest 5,640 acres, and from the Uncompahgre Forest 45,489 acres.

The lands excluded from the Gunnison comprise several strips from one-half mile to one mile in width, located along the exterior boundaries of the western portion of the forest and embracing particularly lands which have agricultural possibilities. The most extensive and important of the changes affects lands lying along the western boundary south of the north fork of the Gunnison River, and along Minnesota and Reynolds creeks. Also a few sections have been eliminated along Smith's Fork and Crystal Creek.

The lands excluded from the Cochetopa are rolling foothills and level flats along the exterior boundaries of the southeastern portion of the forest in three different places.

The lands excluded from the Uncompahgre are located in the southeastern corner of the old Uncompahgre Forest, in San Miguel County. The territory contains no merchantable timber of value, and is not considered of importance from the standpoint of forest conservation. Of this area, 23,560 acres has already been alienated through homestead and other entries.



The Fire Protection Work with the Railways

In the Northwest arrangements have been made to put in operation the cooperative agreement between the men of the department of forestry and the officials of the railroad companies which traverse the national forests. The forest engineers are making detailed maps, showing all the vantage points and the zones of greatest danger along the railroad lines. Clause 1 of the agreement re-

quires that the railroads clean up effectively all the rubbish, debris, and inflammable material in the zones of greatest danger, and it is necessary for the forest service to designate these zones on maps. The maps have spaces for the railroad companies to insert the names of the men to take charge of this work. The location of the caches of tools are marked on the map and the telephone stations are made in colored spots. This work will be very valuable in helping the parties to the agreement to get together quickly in case fire is discovered along the railroad territory. The zones of greatest danger from fire will be patrolled by men on "speeders," while other districts will be patrolled by men on foot. The forestry department's map will be completed in a few days and then turned over to the railroad companies to fill in their part of the work.



District No. 1

Recently W. B. Greeley, district forester of district No. 1, has been upon the north edge of the Flathead national forest examining two large areas of timber that the government has decided to sell on account of the timber being thoroughly mature. Some of it measures from three to four feet in diameter. When this large timber is removed, it is planned to replant the district cleared.

It is reported that the examination also showed some tracts adapted for agricultural purposes, and as soon as the timber, which is very dense, is cut, the land will be open for homestead entry subject to the existing laws of the government. These lands to be opened for agricultural purposes are situated at the bottom and along the high watershed on the north side of the reserve.

THE WEEKS BILL

The bill for the acquisition of national forests which has become popularly known as the Weeks Bill, passed the House of Representatives at midnight on Friday, the 24th of June, by a vote of 130 to 111. It was fought at every stage by its opponents in the House, and an attempt was made to prevent its passage by dilatory tactics, when it finally came before the House. Its passage was a triumph for the management and hard work of the men in whose hands it has been.

In the Senate the bill came up on Thursday, and an open filibuster was immediately

begun by Senator Burton of Ohio and Senator Newlands of Nevada, assisted, to some extent, by certain other senators. Owing to the determination of the Senate to adjourn on Saturday, the filibuster was successful in preventing the passage of the bill at that time, but an agreement was reached by which a vote will be taken on the bill on the 15th of February, 1911.

In the August number of AMERICAN FORESTRY we shall give a fuller account of the proceedings, and an analysis of the vote on the bill in the House.

STATE WORK

The Louisiana Forest Law

Unless unexpected delays occur, by the time this issue of the *Journal* reaches its readers, Louisiana will have placed itself upon record as having enacted into law the first up-to-date forestry bill to be passed in any of the southern states. The bill would have been introduced several weeks ago, had not some of the larger lumber interests of the state asked for additional time to examine it.

The bill as it seems certain to pass is essentially a fire protection measure. The tax imposed for fire protection will be three quarters of a cent per 1,000 feet on pine, and the same amount on hardwoods. The constitutionality of this tax on lumber has been questioned, and may ultimately be tested in the courts.

The sentiment of the lumbermen seems to be that, inasmuch as the passage of such a bill is demanded at this time, the provisions of the bill, as introduced by Representative Henry Hardtner, representing the Conservation Commission, are as mild as can be expected, and most of the lumbermen seem inclined to accept this bill in lieu of other and more radical measures which might be forced through.—*Lumber Trade Journal*.



Forestry for Profit

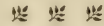
M. W. Wentworth, steward of the sanitarium at Battle Creek, has embarked in an extensive experiment in forestry, according to *Michigan Roads and Forests*. He has bought the sanitarium farm of 200 acres at the south end of Lake Gogouac, formerly known as the Gregory homestead, and will plant 10,000 trees. The varieties that will be planted are the black locust, the catalpa, and the spruce.

The spruce will be grown for Christmas trees and the locust for fence posts and railroad ties. The catalpa and locust will be grown on the marsh land, of which there is quite an extensive area adjacent to the lake. This will utilize land that has hitherto been useless for cultivation. Mr. Wentworth is the second person in that section of Michigan to make the experiment.

The first person to make an experiment in this line was Clayton Strait, of the township of Emmett, Calhoun county, who three years ago set out 300 sweet chestnut trees on a piece of land on the shores of Beadle Lake. The trees were obtained from the Michigan Agricultural College and at that time were

only a few inches in height. They have nearly all lived and are now from five to six feet in height. So far Mr. Strait's experiment has been a success.

The experiment of Mr. Wentworth will be watched with much interest, as it is on a much larger scale than Mr. Strait's. If the black locust and catalpa will grow in marsh land there are thousands of acres in Michigan that can be devoted to tree growing.



New Hampshire

Two nurseries, intended largely for the production of white pine seedlings, have recently been started in the state. The members of the New Hampshire Forestry Commission, not having succeeded in obtaining state legislation to establish a nursery, have undertaken to start one themselves as an object lesson, and this has been established in Pembroke. It is the hope of the promoters of this enterprise that at no distant day the state will maintain a nursery from which New Hampshire land owners can obtain stock at cost price for reforesting the lands of the state. The forestry commissioners conceived the idea of establishing this nursery because, for a number of years past, they have received annually a great many inquiries from residents of the state as to the best method of procuring seedlings and the nearest place from which they could be obtained. It was felt that those who made these requests should not have to be sent outside the state, and after a tour of the state to determine the most desirable site, arrangements were made for establishing the nursery on the farm in Pembroke. Already about 80,000 seedlings had been successfully raised on the farm, and these were taken over as a nucleus for the new work. The members of the commission personally meet the expenses of the enterprise. There is no intention of making this a commercially profitable enterprise. The object is to furnish seedling trees to residents of New Hampshire at the actual cost of production. The nursery contains at present between sixty and sixty-five thousand trees, and it is the plan to largely increase its production.

In the town of Hinsdale, the Keene Forestry Association has about fifteen acres under cultivation and is growing 400,000 yearling pine trees, while about 170,000 trees two years old were sold this year. There are also several acres of trees of this year's seeding

which are just coming up, the length of the seed-bed, figuring each row, aggregating no less than three miles.

Private Forestry in Pennsylvania

On lands owned by him near Reading, Pa., Jacob Nolde carries on forestry operations, employing a professional forester. Under his direction, says the *Reading Telegram*, there have already been planted hundreds of thousands of trees, and important investigations are being carried on as to trees best adapted to this locality, as well as to the diseases to which the trees are most subject. It is impossible to expect that Mr. Nolde's example will be extensively followed at once, but he is pointing the way by which the wealth of the country may be greatly added to during the coming generation, and when the people wake up to the great possibilities of the reforestation, on scientific lines, of the great acreage of waste lands that lie within the borders of the county, it will only be necessary to follow in the path which he has marked out. The extent of Mr. Nolde's operations may be judged by the fact that his plantings, this spring, ran to the number of some 150,000 trees.

Washington

A commission of twelve men has been appointed by Governor Hay to devise a comprehensive scheme of forest legislation. The commission is to study the logged-off lands problem, forest fire protection, reforestation of lands unfitted for agricultural purposes, and similar matters, embodying their investigations into a report, which will be transmitted by the government to the next legislature.

The members of the commission are: A. G. Avery, lawyer, Spokane; J. J. Brown, president Washington Conservation League, Spokane; George S. Long, president Washington Forest Fire Association, Tacoma; E. G. Ames, vice-president, Port Gamble, and D. P. Simons, Jr., chief fire warden, Washington Forest Fire Association; J. J. Donovan, Bellingham, president Washington Logged-off Lands Association; Prof. F. K. Benson, University of Washington; George E. Boes, Seattle; Prof. F. G. Miller, dean of the forestry school, University of Washington; R. W. Douglas, elective secretary Washington Conservation Association; Frank H. Lamb, Hoquiam, secretary Western Forestry and Conservation Association, and Prof. R. W. Thatcher, dean of the agricultural school of the state college at Pullman. All are members of the Washington Conservation Association.

EDUCATION

University of Wisconsin

In considering its educational opportunities and responsibilities in connection with the new forest products laboratory, the University of Wisconsin, recognizing the thoroughness with which the neighboring universities of Michigan and Minnesota occupy the field of forestry instruction, decided that it could do the best service for education by providing practical courses along special lines, such as the laboratory would offer special facilities for. The announcement of these courses, as planned for the coming year, is now made. They are described as courses of instruction in wood technology and the mechanical engineering of woodworking plants.

The three phases of the problem of saving timbers and using all the present waste from the lumbering and wood manufacturing industries will be considered in the new lectures and laboratory practice by the students, including special study of the physical and chemical properties of wood; of preserv-

ing and utilizing not only the timbers, but the stumps, small branches, bark, sawdust, and all the waste bits; and of the mechanical means of transforming standing timbers into commercial products.

Four courses in wood distillation, wood preservation, the chemical constituents, and the physical properties of wood will be given by the staff of government experts in charge of the laboratory. A fifth course in wood manufacturing machinery will be given by Prof. Robert McKeown, of the engineering college.

In the course on the properties of wood, the study will be mainly of the elementary structure of different species and its effect on the value of woods for use in various arts and industries. Methods of testing woods and conditioning them will also be shown in the laboratory demonstrations. The course will be given during the first half of the first semester.

The chemical constituents and fibers of wood, with reference to the uses made of the

material in art and industry, will form the subject-matter of the course to be given the second half of the first semester.

Hardwood and softwood will be studied and compared as to their use in distilling alcohol and producing turpentine and other materials in a course to be given in the first half of the second semester. All of the basic principles, as well as the processes and products of such distillation will be taught, and the students will have an opportunity to make a personal study of the government's investigations in ways and means of using all the waste products of logging, lumbering, and wood manufacturing, amounting altogether to two-thirds of every tree cut down.

How to save timbers, especially those in mines and on the water front, from animal and fungous pests, will be the problem on which a course in wood preservatives will work. The students will compare the resistance of different woods, their fibers and the conditions of deterioration, and will be shown the different preservative processes in the laboratory, including both those in which the timbers are given surface applications and those in which the aseptics are forced into the fibers.

All the machinery and methods used in logging and in wood manufacture with the designing of woodworking plants, will be taught by Professor McKeown during the second semester in his course on wood manufacturing machinery.

In addition, advanced research work may be done by students who are prepared for it in the government laboratory under the supervision of the experts in charge.

Michigan Agricultural College

The summer forestry school opened on the 28th of June and closes on the 11th of August. The session is held at Cold Springs, on the shores of Higgins Lake, and is conducted in cooperation with the Public Domain Commission. The state forest reserve of 38,000 acres, timbered with jack pine, Norway pine, white pine, scrub oak, and white cedar, is located here, and it is upon this that the students will work.

This summer term is required work for junior foresters. Two courses will be given, one in surveying methods and one in forest mensuration. These courses are not complete in themselves, but are followed by advanced work during the remaining terms of the junior and senior years. Each course entitles the student to five college credits. The program provides for one lecture hour and eight hours of field work each day. An hour will be given to target practice, swimming, and boating. The mail address is Roscommon, care of M. A. C. Forestry Camp.



Washington State Agricultural College

C. H. Goetz, who has been for two years teacher of forestry at this institution, has resigned his position. During the summer he will be in the employ of the Washington State Fire Association in its work of protecting the forests of Washington against fire. Ten or more men have gone out of this institution since Mr. Goetz took charge of its forestry work and are now in the United States and other forestry work.



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Reports and Bulletins from Massachusetts

Five substantial pamphlets of considerable local importance and of value to students of forestry all over the United States have come from the office of the state forester of Massachusetts. The first of these is the Annual Report for 1909. This report shows a great expansion in the scope and organization of the department, owing to the placing upon it of the task of the gipsy and brown-tail moth control, which until a year ago was in the hands of separate officials. The staff now includes, beside the state forester, Mr. Rane, four assistants, a secretary, three clerks and fifteen agents and division superintendents. Besides these, there is a forest warden in every town of the state, whose appointment is primarily by the town or city officers, subject to the approval of the state forester, under whom the forest warden's work is done. The expenditures for 1909 were \$10,000 for the general forestry work, \$9,842.87 for reforestation work, and a little less than \$300,000 for the moth suppression work.

A bulletin on "Reforestation in Massachusetts," by R. S. Langdell, assistant forester, is of much interest in view of the modest but persistent work which the state has undertaken in the way of reforestation. This work is being carried on under a systematic plan, authorized by law and supported by a continuing annual appropriation of \$10,000. The bulletin referred to describes the methods of work pursued, shows by illustrations the character of it, and discusses the trees most favorable for such work in the state. From the forester's report for 1909 we learn that nine hundred and twenty-seven acres were planted by the state in that year, these being in tracts from five to 107 acres. And 111,500 trees have been planted by several water

companies and private individuals under the advice of the state forester.

The third bulletin is entitled "How to Make Improvement Thinnings in Massachusetts Woodlands." An earlier bulletin on "Forest Thinning" was published by the state service, but this is much more comprehensive in its discussion of the subject, and uses some of the material of the earlier publication. The author is H. O. Cook, assistant in charge of that part of the state forest work.

W. F. Fiske, agent and expert of the Bureau of Entomology, United States Department of Agriculture, who has been in charge of the work of developing parasites of the gipsy and brown-tailed moths in Massachusetts, is the author of another bulletin published by the state service on that subject. It is an extremely interesting publication, especially for all those who are within the danger zone of these destructive moths. Mr. Fiske is an industrious and careful worker, and has obtained a very good mastery of his subject. He treats the nature of insect parasites, the natural control of the moths, the theory and practice of introducing parasites, the sequence of parasites, and the different parasites in detail. The bulletin is quite fully illustrated, and is full of practical entomological information.

The last on this list of state publications is the report on "Massachusetts Wood Using Industries," by Hu Maxwell, the expert of the United States Forest Service, under a cooperative arrangement between the United States and the state services. It is the first of a series of these reports to appear in printed form. This report gives the amount of different varieties of woods used in the industries of the state, the cost at the factory, and the amount grown in the state. It also gives an analysis of the wood used by each class of industries and the average cost to them of their raw material. It is interesting to notice that the manufacture of boxes and crates heads the list, using sixty-four per cent of the lumber that is consumed in the state. There is, finally, a list of the wood manufacturers from whom the information was obtained and a table showing the uses by species of different woods. These reports, which are a part of the work of the office of wood utilization of the branch of the products of the Forest Service, will be of great practical value in determining the exact status of the lumber business in the country. Reports from several other states are now in preparation.



A Tree Manual for Kentucky

The Kentucky Federation of Women's Clubs did good service when it planned and carried out the publication of the "Native Trees of Kentucky." This handbook by Mrs. Maury, the chairman of the forestry committee of the state federation, is

an excellently done piece of work and is a complete tree manual for the state. The illustrations are good and as the work has been guided and approved by eminent authorities, it is safe to assume its accuracy. It is well printed and the illustrations really illustrate. At the end of the book is a list of 112 trees, native to Kentucky, a list of eight trees that are in doubt, and of ten, the occurrence of which in Kentucky is in doubt. Besides these, there is a list of foreign trees that have become spontaneous in Kentucky. The preparation of such a book as this in all our states would be of great educational value and would doubtless stimulate tree study.

A Fire Protection Handbook

Among the numerous publications that are now being issued by forest officials in regard to the management of forest fires, one of the most practical and serviceable that has come to our attention is a "Treatise on the Protection of Forests from Fire," by W. V. J. Hall and C. L. O'Hara, superintendent and assistant superintendent of the Bureau of Forestry of the Province of Quebec. This is printed in convenient pocket form with a durable cover and treats of the whole subject of prevention and handling of forest fires in a practical and comprehensive way. There is a useful glossary which makes the manual more serviceable for the average layman.

NEWS AND NOTES

Railroad Cooperation in Fire Protection

The Western Forestry and Conservation Association, of which Albert L. Flewelling of Spokane is president, has perfected a plan to utilize certain departments of the railroads operating in Washington, Oregon, California, Idaho, and Montana in warning the people in the five states against carelessness with fires in the forests during the summer months. E. T. Allen, forester of the association, made the foregoing announcement while in Spokane, and outlined the plan in brief as follows:

"Forest protection is of the utmost benefit to all our people, and we believe we can enlist their cooperation in this work. With that end in view all ticket envelopes, time-tables, folders, and pamphlets describing mountain, lake and forest resorts for western distribution will contain suggestions as to how to avert camp and other fires, also the means to be employed in combatting the element. Booklets dealing with the same subject will be placed in observation cars and placards

are to be posted in the waiting rooms of forest stations. The association will bear the extra expense occasioned by this work.

"No agency has quicker and better means of reaching the public than the railroads, as almost every one travels and reads railroad literature, and this step the Western Forestry and Conservation Association is taking is the first attempt to utilize it for forest protection. Railroad officials are keenly interested in the plan, as the roads profit equally with the public in reducing the destruction of forest resources. The lumber industry not only furnishes a large proportion of their traffic, but also brings into the northwestern and coast states more than \$150,000,000 a year, most of which goes into general circulation to build up business of all kinds. Irrigation and power development depend much on forest regulation of stream-flow. Tourist and resort travel is affected by destruction of scenic and game conditions by forest fires, and every acre of timber or second growth destroyed means a money loss to the railroads as well as to the nation."



LUMBERMEN AND LUMBER JOURNALS

The Lumberman's Attitude Toward Forestry

By JOHN E. RHODES, President Minnesota Forestry Association

Reprinted from the *Minnesota Horticulturist*

I am interested in forestry in spite of the fact that I am in the lumber business. I might say I am interested in forestry because I *am* in the lumber business. The lumbermen have looked upon the forester in the past as a good deal of a crank. There was considerable antagonism between the forester and the lumbermen. It is the lumberman who blazes the path. While the theorist looks around for danger, the practical man has his gaze concentrated upon his own business. There are on my grandfather's farm in New York a good many stumps of black walnut larger around than this desk. Those trees were originally cut for firewood, because at that time they had no value and could not be cut for lumber; hence they were used for fuel. The same is true of lumber operations in this country. They cut the white pine because it had the greatest value; later they cut the Norway; and as the price of lumber has advanced the log has decreased in size, the available trees of highest value have decreased, and they have taken one species after another. The lumbermen are taking increased interest in forestry simply because the timber supply is getting to a point where they can afford to do so.

There are two obstacles to the practice of forestry. Lumbermen are confronted first by the fire risk. There is more timber burned in this country every year than is cut by the lumbermen—a great deal more. The lumbermen feel they should not be criticized for what is called “wanton destruction of the forests.” Lumbermen are engaged in the cutting of the timber for the purpose of supplying the demand that exists for it, and the public generally is equally responsible and should share that responsibility with the lumbermen. The great prairie sections tributary to Minneapolis, the great state of Iowa, southern Minnesota, North Dakota, and South Dakota, could not have been built up by the people with the rapidity they have been had it not been for the near and cheap supply of lumber, and if these great forests had not been sacrificed, the present development of this great prairie country would have been impossible. It would not only have meant much to the development of this prairie section, but it would have meant much to the nation at large and to the world at large if the sacrifice of these forests had not been made.

As the lumber production has decreased and the price of timber has increased from 50 cents to \$5 and \$10 per thousand feet, it has become possible to consider the expenditure of money for fire protection and for other things relating to forestry. Some reference has been made to the burning of slashings, and by that is meant the refuse left from logging operations. Lumbermen having large interests found that their property was menaced by timber in which the “slashings” had not been burned, and they favored the law which was passed by Minnesota requiring slashings to be burned. That law is being generally complied with. The lumbermen found it did not cost as much as they thought it would, and they are now taking care of the slashings at 25 cents to 50 cents per thousand on an average. They are sorry they did not do it years ago, and when they add 25 cents to the present value of the timber for fire protection it is a small percentage of the cost compared with what it was when standing timber was worth \$1 per thousand.

Lumbermen in the west are interested in organizing extensive fire protection systems and are cooperating with the nation and state in an effort to establish a federal system of control, putting in telephone lines, hiring extra men during the dangerous season, and taking every possible precaution to protect their timber from fire. The chief cause of fires is railroads; forty-five out of every hundred fires are started by locomotives. Railroads cooperate actively in keeping their rights of way cleared of dead grass and leaves because it is in that way that fires usually start. Thirty-five out of every hundred forest fires are started by settlers clearing land. If the land is to be used for cultivation, the settlers are anxious to clear it off as rapidly as possible, and the quickest way to do this is to burn the refuse, and they are not cautious enough in taking care of these fires. When there is a high wind and a dry season, there is extreme danger. It was the settlers who caused the fires in northern Minnesota and Wisconsin two years ago. Those fires worked such great destruction that the settlers who were responsible for starting them were arrested and taken before a justice of the peace in the town, where they were fined \$5, and they said: “It is worth more to us than that to have our land cleared.” There

was no healthy public sentiment back of the law. The pine will grow if the fires are kept out, but will not if the fires are not kept out. If the fires are not kept out, it will burn up the small seedlings, the cones are destroyed, and worthless brush will come up.

The second great obstacle to the adoption of forestry by lumbermen is the question of taxation. There is much agitation in the country for the preservation of forests and for reforestation of cut-over lands. The lumbermen are interested in this question just as much as the forester or the public and hope some solution will be worked out. It takes from seventy-five to eighty years to grow a white pine tree to merchantable size. We are confronted with the fact that we are obliged to pay taxes every year upon a crop that has not been harvested or that may not be harvested twenty years hence. The farmer pays taxes on his land, but he harvests a crop every year. The lumberman may pay a large amount of taxes before his crop is harvested. The present system of taxation makes scientific logging methods absolutely impossible. We have considered this question from every standpoint, and various plans and methods have been proposed. There is before the people of the state of Minnesota a proposed amendment to the constitution, permitting the legislature to enact a special forest land tax law. If there exists sufficient public sentiment in Minnesota that amendment to the constitution will pass. It is very difficult indeed to arouse sufficient interest on the part of the general public to vote in favor of an amendment to the constitution. We need to go through a few more fire years such as we have had in the past to arouse public interest to see the necessity of revising the tax laws, and if there is a demand for practical forestry methods we must secure some relief from taxation, or they cannot be undertaken.

The lumberman is greatly interested in forestry schools. We are particularly interested in the forestry school of this state in charge of Prof. Samuel B. Green. We look to the foresters that are now being educated to work out these problems for us. The lumbermen who are now passing—the older generation of lumbermen—who have been engaged in business under methods in vogue for the past forty years, cannot be expected to see the necessity for new methods. They cut the timber to supply the demand that existed then, and they did it in the cheapest possible way. It has only been within the past five or six years that the people have come to realize that the timber is not inexhaustible—the older lumbermen now realize it.

The production of lumber has about reached its maximum. It has greatly declined in Minnesota. In 1890 the production in Minnesota, Wisconsin, and Michigan was 9,000,000,000 feet, and this year it has been less than 3,000,000,000 feet, but there has been a great increase of yellow pine in the southern and western states, so that the total production

in the United States at large last year was greater than ever. It will be about the same this year, but I think it has reached its climax. Some reference was made by one of the speakers to the fact that the production was less in 1908 than in 1907. That was due to market conditions. You will remember that we had a panic in 1907, which retarded building operations and which extended its effect into 1908.

I also wish to refer to a statement made by one of the speakers in reference to a decision by the Maine supreme court. The papers of the country had a great deal to say in regard to it. The state of Maine has a peculiar law, under which the legislature can ask the opinion of the supreme court regarding the constitutionality of any law proposed before the law is passed. The state legislature of Maine asked the supreme court if a law providing for putting private lands under certain restrictions would be constitutional. The supreme court stated that under the conditions mentioned, which would inure to the benefit and welfare of the community at large, such a law would be constitutional, but the law has not been passed, and the constitutionality of it has not been passed upon. Investigating that subject, we find if there is a tendency to restrict cutting on private lands it is going to result in very serious complications, for this reason: that if the law prohibits the cutting of trees of certain diameter, you immediately get into technical forestry, because different species of timber are of different growths and ages. There are also different requirements for different sizes of logs. We are looking to foresters to work out questions of this kind.

Personally, I have no fear of a timber famine in the future, because I feel sure that, with the careful study which is being given to the forestry question—especially by the lumbermen and timber owners—who, by the way, control three-fourths of the timber supply in the United States—they will find some solution of the question; but it will not be without further advances in values of timber lands, and that will mean a further increase in the price of lumber. Already the price has reached a point where you are using substitutes for lumber. Its principal competitor is cement, and the inroads that cement has made upon the lumber industry in the past few years you are all familiar with. A few years ago the average town had wooden sidewalks; to-day it is a rare thing to find a sidewalk not made of cement, and that change took out of the market the demand for millions of feet of plank. Fences used to be made entirely of lumber; now they are made of wire. Lumber is still being used for buildings to a great extent. Our buildings are, nearly all put up in a hurry in the cheapest possible manner, and we are only just beginning to build them of fireproof material. The price of lumber has reached a point that even where it costs to build a house of cement a trifle more than it would to build

it of lumber, the cement will be used, because it provides greater permanence, with a reduced fire risk. So we expect in the near future, possibly in fifteen or twenty years, to see a natural decrease in the production of lumber.

This also takes into consideration the lumber to be cut on national forest reserves and the increasing tendency of the states to buy timber lands for state reserves. We are going through the experience of the older countries. It is here exactly as it has been in Germany and France up to this stage, and there is no reason to believe that the future will be any different from what it has been in the old countries, where the consumption per capita of lumber is less than a hundred feet, compared with the per capita consumption in this country of 500 feet. We will have to reduce the consumption per capita, protect our forests from fires, and provide a just and proper system of taxation. I may say in regard to this system of taxation that there should be no tax on land until a crop is taken from it, and when the crop is harvested it should be taxed for its full value. This method has several advantages: it enables the owner to protect the timber from fire; it eliminates the carrying charge which comes every year; and it makes it an object for him to save and protect the timber until it is ready to cut.



National Hardwood Lumber Association

The National Hardwood Lumber Association held its thirteenth annual convention in Louisville on the 9th and 10th of June. The meeting was an important one, as the future policy of the organization was discussed and action was taken on the question of uniform inspection. The solution of this matter carried with it the appointment of a committee to secure a uniform standard of grading. The report of the committee on forestry was presented, as follows:

REPORT OF COMMITTEE ON FORESTRY

"The annual report made by your committee during the last several years has contained an intelligent survey of the existing conditions, and it has been its desire during the last year to watch closely developments and to note the attitude of the national government, as well as those of the various states, together with the action of the individual lumbermen, toward this all-important question.

"Among the nations of the world, the United States has for the last fifty years been noted as a country of deplorable waste, and, as we know, the hardwood lumber industry has keenly felt the lack of economy. We believe that our association has had much to do with the present recognition on the part of the chief executive of our nation and of Congress as to the crying need for the en-

forcement of such regulations as will effectively bring about a real conservation of the natural and national resources of this country.

"We deem of first importance a rational tax exemption law, patterned after the timber regulations of our neighbor, Canada, which will encourage the preservation of our forests, and not force, as at present, an immediate cut under penalty of expensive taxes. If laws were enacted which would make the American taxes only nominal, as in Canada, until the timber is cut and manufactured into lumber, then judgment and sagacity would be exercised in the amount and sections to be cut each year, so that the supply could be intelligently regulated to the demand, and reforestation could be greatly encouraged.

"At the present rate of consumption in the United States of over 50,000,000,000 feet of lumber per annum, it requires no prophet to foresee a complete exhaustion of the visible supply, unless a superhuman effort is exerted by the national and state legislatures, together with cooperation on the part of all men interested in lumber, to safeguard the standing timber and adopt effective measures for reforestation.

"Available statistics show that 3,000 to 5,000 sawmill men who are yearly sawing out their hardwood stumpage do not know which way to turn for future operation. Final exhaustion of hardwood timber in the United States would constitute an incalculable commercial loss and be far more reprehensible than the extermination of the American bison.

"Finally, the establishment of forest patrol by the government for the national forests, and by several of the states and many large concerns, is becoming wonderfully helpful in preventing forest fires. The annual average expense of this work has been about 4 cents an acre, including patrolling, clearing out old trails, making new trails, and actually fighting new fires.

"In southern California, where the forest cover of the mountains is of tremendous value in conserving the water to be used for irrigation, business men and bankers combined with the fruit growers, who were directly interested, and contributed a large sum of money, which they offered to the Forest Service on condition that the government give an equal sum, the whole to be spent by the Forest Service for fire protection work on the San Bernardino national forest reserve. The offer was promptly accepted, and a plan was adopted dividing the forest region into sections, which were separated by fire breaks or lanes fifty-five to eighty feet wide.

"From these lanes the brush and timber were removed to the roots, so that if a fire started it would be confined by the breaks to a comparatively small area, even if not discovered promptly. Trails were constructed to give ready access to the most important parts of the reserve, and a patrol was formed to watch for the first thread of smoke from

a starting fire. The result has been that since the beginning of the work in 1906 not a single fire of any magnitude has destroyed either timber or brush, or, what is perhaps more important, the spongy forest soil which is depended upon to hold back the water for a longer period of use.

"The forest rangers who have charge of the national forest reserves in the United States each have about 670 square miles to watch; in Germany each forester has but two square miles to patrol. These rangers are valuable in many directions, because they not only patrol the forests and direct the fighting of the fires, but also collect evidence of and institute prosecution for violations of the fire and timber laws.

"This is only another evidence of the trend of the times in recognizing the value and needs of the great timber industry, and of intelligently applying regulations which can not only mean the prolongation of the natural supply, but also prevent our becoming dependent in a few years on our Canadian neighbor for a timber supply that she may be loath to accord us. In view of the expanding growth of northwestern Canada, which has of late attracted so many Americans, that progressive country, with a watchful eye for the future, will profit by the economy of the old world and the extravagance of the United States, and undoubtedly reserve for her own use the virgin timber with which she has been so richly endowed by nature.

"In conclusion, we urge your honorable body to reaffirm your past declarations and extend effective effort on the following important points: (1) Tax exemption, which will result in an equitable annual cut; (2) a system of ranger patrol, preventing and curtailng fires and wanton waste; (3) a practical reforestation plan which will instill into the minds of every citizen the necessity of providing a timber growth for future generations."

The following officers were elected: President, F. A. Diggins, of Cadillac; vice-presidents, F. S. Underhill of Philadelphia, Orson E. Yeager of Buffalo, and J. V. Stimson of Huntingburg, Ind., and the following directors: For three years, T. M. Brown of Louisville, C. A. Goodman of Marinette, Wis., Oliver O. Agler of Chicago, E. E. Goodlander of Memphis, E. V. Babcock of Pittsburgh, J. H. P. Smith of Cincinnati, and Charles B. Dudley of Memphis; for the two-year term, Arthur H. Bernard of Minneapolis.

Mr. Diggins, the new president of the association, is one of the group that are responsible for the good management and skilful utilization that has distinguished the wood manufacturing industries of Cadillac, Mich., above those of many other towns with equal advantages in the beginning.

It was decided that the annual meeting of the association in 1911 should be held in Memphis, Tenn.

The Grading Conference

On the 31st of May and the 1st of June, representatives of the Eastern States Retail Lumber Dealers' Association, the New York Lumber Trade Association, and the Hardwood Manufacturers' Association met in New York and conferred upon the matter of grading rules. The changes decided upon are epitomized as follows:

1. It was decided that when a question of grade only was in dispute, it would be necessary to hold only that part of the shipment intact that was complained of, instead of the entire car, but that when the question was one of quantity, the entire car must be kept intact until agreement was reached.

2. The standard rough thicknesses were adopted as shown in the book, and to this was added that ten per cent of the shipment, which might be one-sixteenth inch scant of the standard thickness

3. Slight reconstruction was made in the sap specifications for No. 1 common poplar, the quantity of sound discolored sap admitted being reduced to twenty per cent.

4. In the divisions of lengths under No. 1 common in the various woods, the percentage of short lengths was held by the eastern lumbermen to be too severe, and these divisions were changed one foot.

5. Also, along the same line of short lengths, the percentage of the short lengths allowed the first and seconds and in No. 1 common were reduced five per cent in all the various woods.

6. In the grading book of the Hardwood Manufacturers' Association, except in poplar, no percentage of firsts was specified, and it was decided to insert in the rules the percentage of firsts that should be contained in the combined grade of firsts and seconds. This was set out in detail.

Secretary Doster, of the Hardwood Association, is quoted as saying that this is the first time in the history of the hardwood industry that an agreement has been reached along these lines of such far-reaching proportions and of so great importance to the industry.

The representatives to the conference were men of high standing in the business and they represented influential associations with very large interests. The *St. Louis Lumberman*, in its report of the conference, sums up the result by saying: "The question of waste will be helped toward solution by the workings of this agreement, which allows the producer to work up more of his material than in the past, and thus conserve the ends of conservation. He is enabled to utilize the short clear lengths, by the cutting up process, which, in the entire board, would not be of sufficient value to stand the freight on long hauls, and would be left in the woods to decay."

Chicago as a Lumber Market

Lucius E. Fuller, editor of the *Lumber World*, in the *Pioneer Western Lumberman*, describes Chicago as the "premier lumber market of the world." He states that the largest wholesale lumber yard in the country is located there, and that there is a stock on hand at all times in the pine and hardwood yards of from 300,000,000 to 380,000,000 feet of rough lumber. He also notes the quantity of hardwoods and the great variety of all kinds that may be called for. The receipts of lumber at Chicago by rail and water in 1909 aggregated 2,578,309,000 feet, an increase of 509,675,000 feet, or twenty-four per cent, over the receipts during 1908. Of this amount 1,614,000,000 feet were consumed in the city for purposes of various kinds. The shipments from Chicago in 1909 were 969,000,000 feet, being nearly 200,000,000 feet larger than in 1908.

These figures, Mr. Fuller says, are far ahead of the reports furnished by New York, and fully double the figures emanating from other markets where any record is kept of the lumber movement.



Making the Most of the Log

A subscriber for the *American Lumberman* directs attention to the large amount of stumpage that well could go into higher uses that is being sawed into low-grade products by men who are not directly engaged in the lumber business. In the east such operators are buying areas of timber, logging them, and turning the entire product into goods for their specific requirements, with the inevitable result that a large amount of high-grade stock goes into this consumption along with the low-grade timber that is properly suited thereto. They are satisfied because they can manufacture these articles at a low cost, even with the high grades in, since the operation is all their own and the profits of manufacture their own exclusively.

Yet a question arises as to whether they are not throwing away good profits in sawing up No. 1 pine or spruce into low-grade articles. Unfortunately, not only they are the losers, if such be the case, but the public at large is a loser. Their own loss is, their own lookout, and the man who ignores the opportunity to take a larger profit receives but scant sympathy. In recent years, however, the men who are cutting the forests of the United States have had it indicated to them that they have responsibilities larger than that they owe to stockholders or themselves. Every good log that is used for a baser purpose than that to which it is suited is a loss to the lumber industry of the United States and to the consumers who are dependent upon that industry for their lumber supply.

It is difficult in this practical age to preach altruism, but perhaps a demonstration of the sacrifice of profit in this indiscriminate use of timber might appeal to such a timber consumer and thereby serve the higher purpose of saving high-class stock for high-class purposes, now certainly sufficient to consume all of the upper grades that are available without permitting them to be manufactured into articles that can as well be made from lower grades.—*American Lumberman*.



More Money for Fire Protection

The state forestry commissioner believes that if the legislature and the forest fires would occur at the same time, the state would be better equipped to fight the latter. At the present time, there is available each year \$14,000 to support the work of protecting the forests of the state, a sum by far too little if the work is to be effective in seasons when there is the greatest danger. The proper expenditure of a much larger sum would save many times as much in property that is now wiped out annually by fires in the timber sections of the state.—*Mississippi Valley Lumberman* (Minneapolis, Minn.).



NEWS AND NOTES

Forests as Gatherers of Nitrogen

At a recent meeting of the Society of American Foresters, a paper was read by Treadwell Cleveland, Jr., on "Forests as Gatherers of Nitrogen." This paper summarized results recently obtained by Jamieson, of Scotland, and by Zemplen and Roth, of the Royal Hungarian Experiment Station at Selmechanya, which tend to show that forests are able to appropriate free atmospheric nitrogen by means of their trichomes. Jamieson investigated several forest trees (as well as a number of small plants), among which were *Accr campestre*, *Tilia europæa*, *Ulmus campestris*, *Sorbus aucuparia*, *Fagus silvatica*, and *Picea concolor*. Zemplen and Roth included a large number of additional species. In all cases chemical tests show the presence of nitrogen in the trichomes, and the investigators believe that they have excluded all other sources for this nitrogen than the atmosphere. Professor Henry, of the Forest School at Nancy, France, was the first to point out that forest soils are enriched in nitrogen by the decay of fallen leaves.

Zemplen and Roth are cautious in their conclusions, and urge that further investigations be made in this field.



Eucalyptus for Railway Ties

The Atchison, Topeka and Santa Fé is one of the great railway systems that has gone largely into the growing of trees to supply it with cross ties. On the San Dieguito Ranch, of 8,600 acres, purchased by the company several years ago, eucalyptus is being grown on a large scale. The ranch lies in

the valley of San Dieguito River, five miles east of Del Mar. Much of the land was rough, hilly, and overgrown with greasewood. The ground was first cleared, harrowed, and then prepared for planting. Three years ago the first seedlings were set out. The company since then has planted 500 acres a year. The seedlings are set out eight feet apart in rows and the rows five feet apart. This provides for the planting of 1,100 trees to the acre. When about six years old many of the trees will be thinned out. At that age the trees so cut out will yield three or four good fence posts to the tree, with leavings for firewood, bringing in considerable revenue.

The thinning process will be kept up until about 200 trees are left on each acre of ground, which means several thousand ties when they are eventually cut. Ordinary ties now are worth about \$1 each. Twenty years from now they will be worth a great deal more. Eucalyptus culture demonstrates that saplings will grow from old tree stumps. This provides for a second crop to be grown more quickly than the first. The blue gum is expected to make a yearly growth of from twelve to fifteen feet during the first few years.

The Santa Fé started in to grow the trees without irrigation, and so far has been successful beyond expectations. However, to insure a more rapid growth, recently a large pumping plant has been installed.

Several varieties of the sugar gum planted three years ago have reached a height of eighteen to twenty feet and from fifteen to sixteen inches in circumference. The sugar gum is being grown exclusively for tie-making purposes. The company expects to allow the trees to grow twenty years before they are cut.



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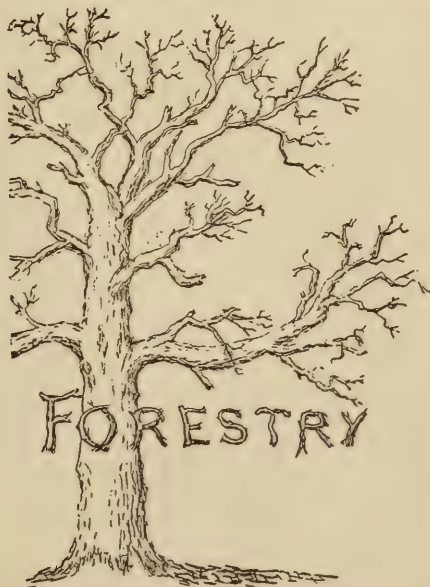
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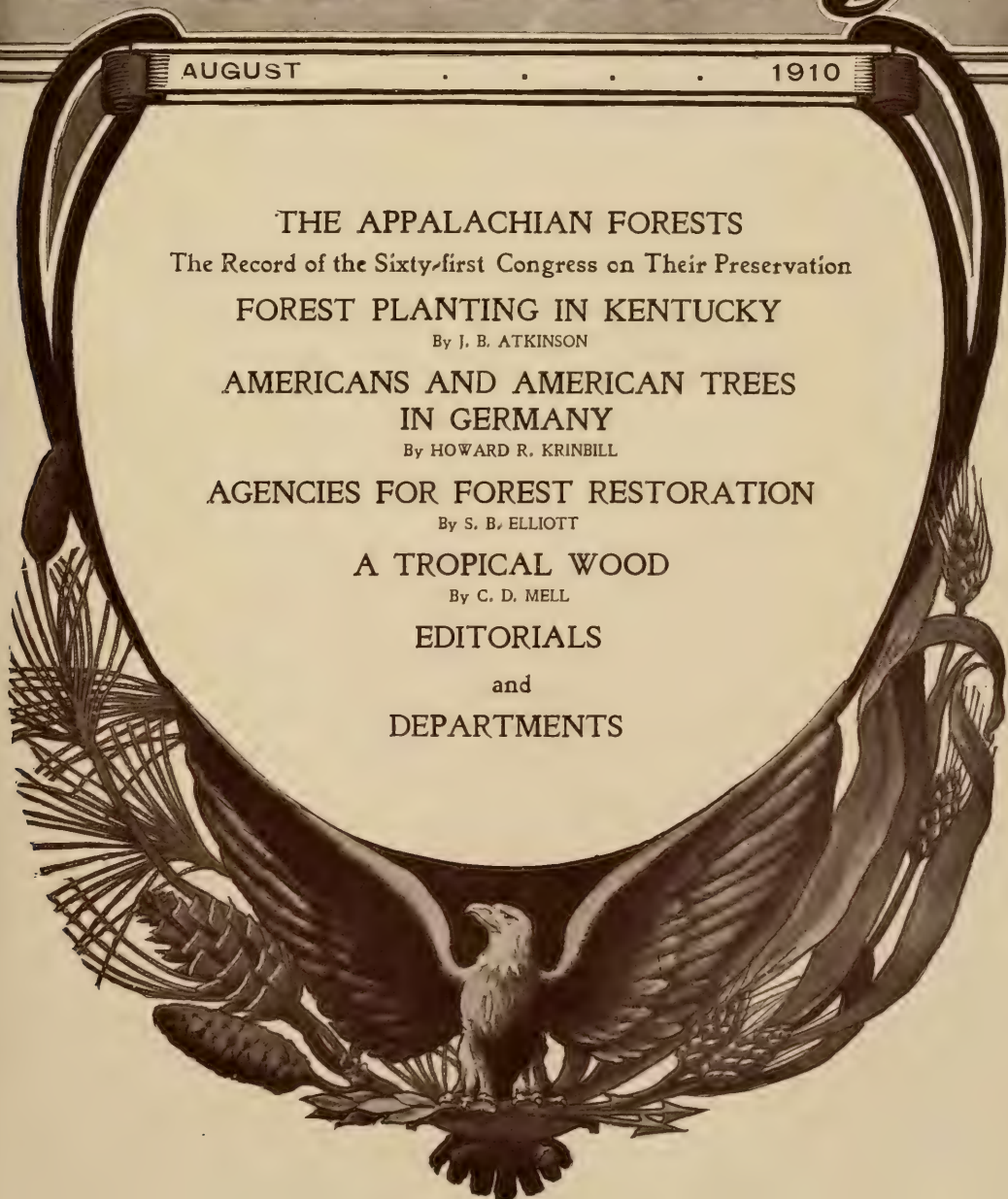
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Indexes for Vol. XV (1909) are ready and may be had on application

The American Forestry Association

is a national organization composed of public-spirited citizens who are interested in the prevention of the wholesale destruction of our forests, in forest extension and utilization, and in the fullest cooperation of national, state, municipal, and private agencies for these purposes. The Association has no business or governmental ties or alliances. Its work is to educate the people to know and understand the value and necessity of forests in the Nation's life and the way to maintain them to the best advantage through scientific forestry; and to bring about such wise legislation as will best secure the desired results. It is the people's forestry advocate and the representative of forestry before the people.

DEPARTMENTS OF WORK

MAGAZINE DEPARTMENT.—This department publishes *American Forestry*, the only popular monthly magazine of national circulation in its field. It has a strong force of editors and contributors and is well illustrated. The subscription price is *two dollars* a year.

EDUCATIONAL DEPARTMENT.—Series of educational and general bulletins and leaflets will be issued at intervals. These will be sent to all members and will be provided for distribution at a nominal cost. The first numbers of the general series are a brief summary of the history and need of the project for National Forests in the southern Appalachian and White mountains; the record of the vote on the Weeks bill, looking to that end, in the Sixtieth Congress; and a part of the argument for the Appalachian forests by the President of the Association, Hon. Curtis Guild, Jr., in his annual address for 1910.

LECTURE SERVICE.—It is proposed to establish a lecture service through which reliable lecturers upon forestry subjects may be obtained. This bureau will arrange with able lecturers at central points who will be available for lectures, with illustrations if desired, before clubs, associations, boards of trade, or general audiences.

CORRESPONDENCE BUREAU.—Through this bureau the Association will furnish information on forestry when possible and provide advocates of the cause with material.

LEGISLATION DEPARTMENT.—As it has always done, the Association will use the agencies at its command to secure the passage of wise legislation in furtherance of its great purpose. Its national character and the location of its main office in Washington enable it to keep in close touch with national legislation and it will cooperate, when practicable, with forestry workers in the several states to promote good state legislation. Its first and most important object in legislation is the passage of a measure for the creation of National Forests, with especial reference to the southern Appalachian and White mountains.

The development of these lines of work to their highest usefulness requires the maintenance of a considerable staff and an expensive plant. Contributions for the work, or for any particular phase of it, are always welcome. The income of the Association by which its general work is supported is derived from membership fees, which are as follows: **Annual members, one dollar yearly; contributing members, ten dollars yearly; sustaining members, twenty-five dollars yearly; life members, one hundred dollars, and patron members, one thousand dollars**, the two latter being exempt from further payments.

All members are entitled to all the rights and privileges of the Association. They receive all ordinary publications. Subscription to **AMERICAN FORESTRY** is extra. The price is **two dollars** a year.

The office is at 1410 H Street N. W., Washington, D. C.

EDWIN A. START, Executive Secretary.

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1410 H Street N. W., Washington, D. C.

Dear Sir: I hereby signify my desire to become a member of the American Forestry Association. One dollar (\$1.00) for annual dues is enclosed herewith.

Very truly yours,

Name _____

P. O. Address _____



Virgin Forest on St. Bernard Mining Company's Land, Kentucky

American Forestry

Vol. XVI

AUGUST, 1910

No. 8

PLANTING FORESTS IN KENTUCKY

By J. B. ATKINSON

OF ALL the great questions to be solved in this country of ours, that of forestry is preeminent. It is the one closest to every citizen. It is related to agriculture, to the navigation of our rivers, to the rainfall as regards great floods or great droughts, to the mining industry of coal, iron, gold, silver, in fact, of all metals dug from the earth. Timber is as necessary to all mining operations as is labor.

Twenty years ago, the St. Bernard Mining Company of Earlington began to plant trees on lands that had largely been turned out as no longer valuable for the growth of tobacco and corn. My experience as a mining man indicated to me that the time would come when timber would be far more valuable and difficult to secure for mining operations.

At that time I had given little thought as to the time it takes our forest trees to mature, and had little knowledge of tree growth. Much timber of the many varieties growing in our Kentucky forests had been cut, and the study of tree growth began by counting the annular rings of the stumps, and much time was spent, then and since, in determining how long it took the destroyed tree to grow. I was surprised and interested. The following table shows the number of years it took various trees to reach the diameter, given:

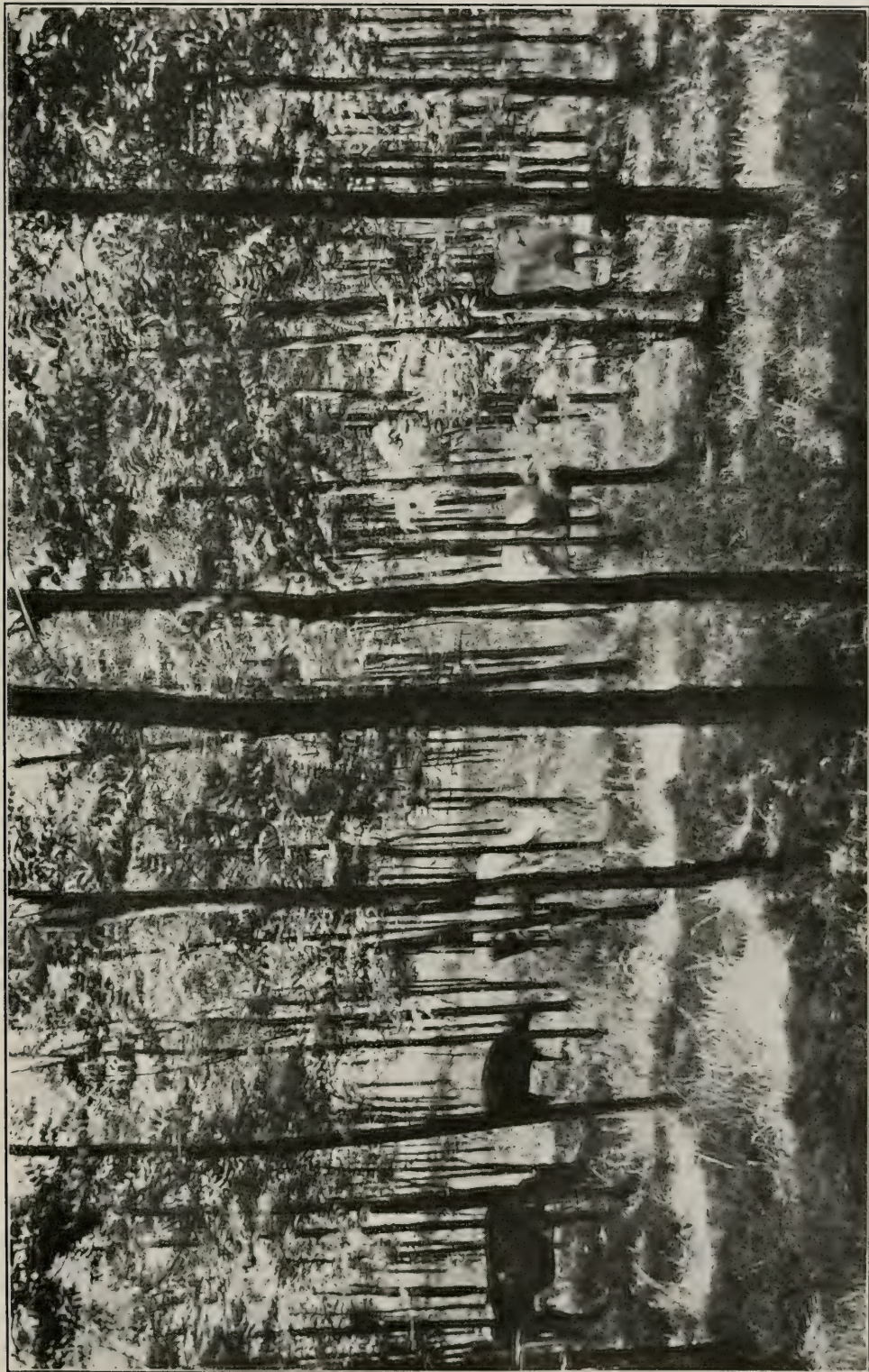
Variety	Age, years	Diameter, inches
Hackberry.....	115	25
White elm.....	120	27
Black oak.....	148	28
Black willow.....	50	18
Sassafras.....	112	19
Sugar maple.....	155	38
Swamp maple.....	134	28
Blue ash.....	273	36
Yellow chestnut.....	...	..
Oak.....	186	21
Post oak.....	150	20
White oak.....	261	48
Scrub oak.....	150	15
Red oak.....	147	27
Sycamore.....	260	57
Tulip tree.....	225	57
Black locust.....	45	13
Beech.....	165	36
Hop hornbeam.....	55	13
Sweet gum.....	184	34
Sour gum.....	141	25
Black walnut.....	189	29
Wild cherry.....	46	16
Shell-bark hickory.....	120	12
King nut hickory.....	163	19
Pig nut hickory.....	163	13
Kentucky coffee.....	25	5
Spanish oak.....	220	38
Texas red oak.....	215	43
White oak.....	173	33
White oak.....	312	36
White oak.....	290	35
White oak.....	275	35
White oak.....	297	31
White oak.....	310	36
White oak.....	325	41

This list includes thirty varieties of our most prominent forest trees. During these twenty years, especial attention has been given to finding the growth



GROWING TULIP TREES

View of forest eleven years old from seed. St. Bernard Mining Company, Earlington, Ky.



GROWING WALNUT, BLUE GRASS AND JERSEY CATTLE
Walnut grove twenty years old from seed. St. Bernard Mining Company, Earlington, Ky.



CATALPA SPECIOSA

Plantation three years old from seed. St. Bernard Mining Company, Earlington, Ky.

of the white oak. Forty-five white oaks of Hopkins county, grown on hills, in the valleys, and on the slopes between, were examined as to the ages when the trees reached twelve inches diameter. The average age was found to be 101 years. The average age when cut was 231 years, with average diameter of thirty-one inches. The oldest tree when cut was 325 years old, with a diameter of forty-one inches, and was ninety-five years growing to a diameter of twelve inches. The youngest was 142 years old when cut, with a diameter of twenty-seven inches, and was seventy-five years growing to twelve inches.

Thirty-five of these trees were over 200 years old. Four of them were over 300 years old. From the facts collected during these twenty years, I have made a table of the time it takes certain trees, in Kentucky, to grow to a diameter at the stump of twelve inches. This is not an infallible table, but it is based on actual tree growth as observed in the forest; and has no reference to isolated growth, or to unusual conditions. The pin oak will grow to twelve inches diameter in forty years; black locust in forty-five years; tulip in fifty years; black walnut in fifty-six years; Texas red oak in fifty-eight years; sweet gum in sixty-two years; ash in seventy-two years; hickories in ninety years; white oak in 100 years.

The first tree planting was with the black walnut, the nut of which was planted in the autumn with the hull on, when the nuts became mature. The ground was prepared as for corn, and the nuts planted four feet apart each way, or 2,770 to the acre, being covered with soil from one-half to one inch in depth. The land was cultivated for three or four years the same as for corn, and then blue grass sown, the idea being that in ten or twelve years the trees would be large enough to permit pasturage.

On the poorer of the thrown out farm lands we plant black locust. This tree, belonging to the pulse family (the family of the clover and the peas), draws its nitrogen from the air and enriches the soils. We plant these trees

seven or eight feet apart each way, and cultivate as we do the walnuts.

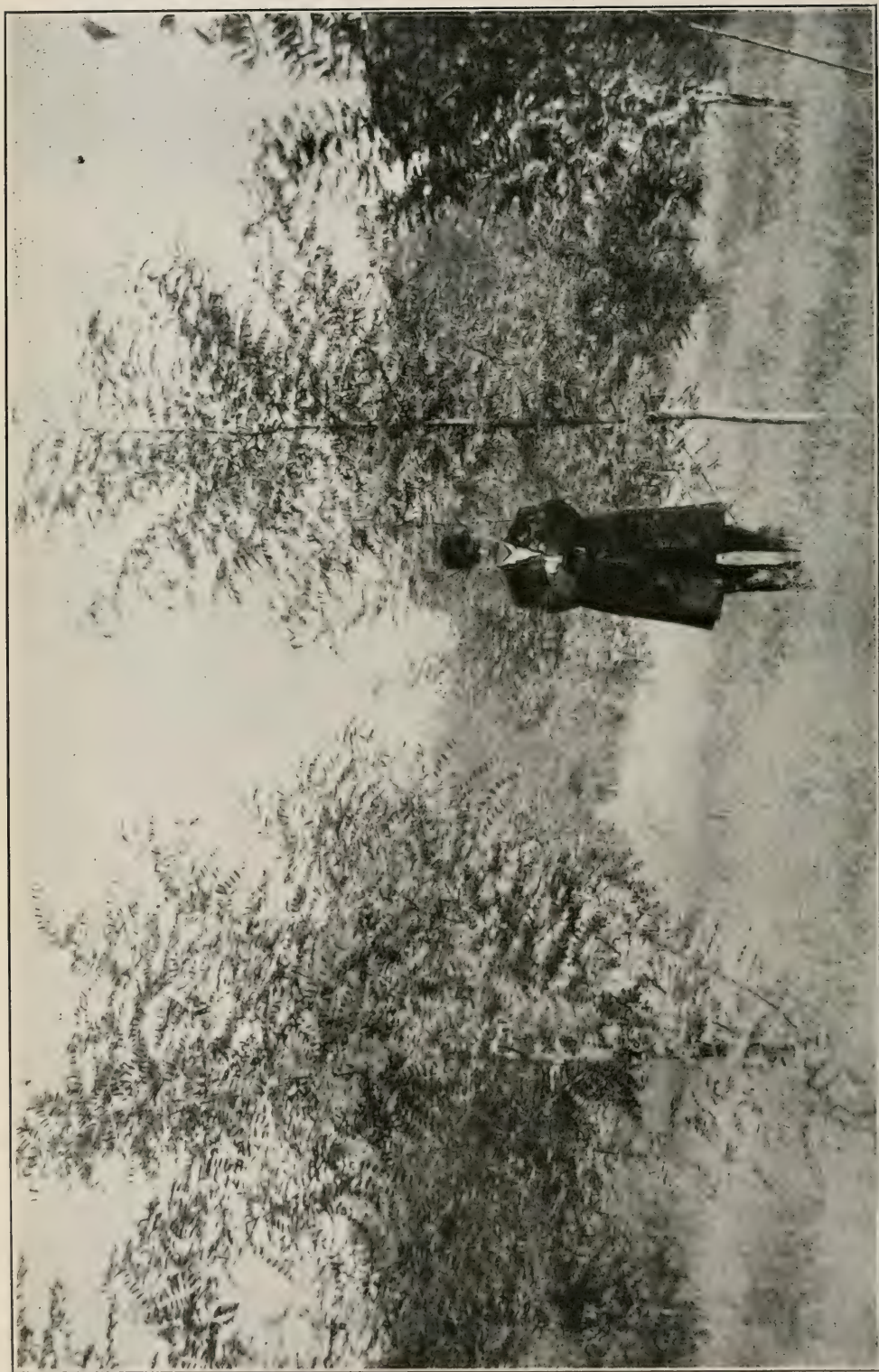
We also plant the *catalpa speciosa*, a rapid growing tree from the Wabash Valley. I have found this tree, growing from twenty-one inches to twenty-four inches in diameter at the stump in thirty-eight years. This *catalpa*, according to authorities, makes the most enduring fence posts, telegraph poles, and railroad ties. It is planted spaced seven or eight feet, and cultivated like the walnuts for three or four years.

The tulip tree, commonly called the yellow poplar, is a most durable tree, and should be planted on good land, the trees ten feet apart each way, or 435 to the acre.

Up to the present time, the above-mentioned four varieties are the only ones planted by us for the growing of new forests. From the autumn of 1888 to the spring of 1909, inclusive, my company has planted 430,000 black walnuts on 162 acres; 160,000 *catalpa speciosa* on 230 acres; 200,000 black locust on 280 acres; 10,000 tulip on twenty acres; and 850,000 black walnuts in vacant places in the forest, largely in bottom lands, a total planting of 1,650,000 trees.

As one of the most accomplished of foresters, Dr. C. A. Schenck, of Biltmore, N. C., writes me: "If forestry is a desirable industry, it is entitled to the fostering care of the public. As an industry, it stands unique, by the long time required for the production of its raw material, which exceeds the length of production entailed in any other kind of industry. This makes forestry impossible unless the people offer to the corporation or private individual practicing forestry special aid and special inducement and special privileges, similar to those which the people have given for public purposes, as railroad and telegraph companies, and other corporations acting for and in the people's common interest."

In Europe, planted forests are estimated to mature as follows: Spruce, ninety years; pine, 100 years; fir, 120 years; beech, 120 years; and oak, 160 years.



BLACK LOCUST

Forest three years old from seed. St. Bernard Mining Company, Earlington, Ky.

In Kentucky, the tulip would compare with the spruce or pine, with a diameter at the stump of twenty-four inches in the 100 years. The black walnut at 120 years should be twenty-five inches in diameter, and compare with the European or American beech. Our white oak would be eighteen inches to twenty inches in diameter in the 160 years, considered as mature as in Europe. All trees thrive as the soil is good or indifferent, and maturity depends much on the same condition.

The forest planting of walnuts twenty years ago has been thinned out until the stand is much less than 1,000 to the acre. Twenty-nine trees twenty-five to thirty-five feet high, occupying 1,100 square feet, have now an average circumference of seventeen and one-half inches, or five and one-half inches diameter. The largest tree is nine and three-tenths inches in diameter, the smallest three and four-tenths inches. A young tulip forest, eleven years old from the seed, has produced trees six inches in diameter.

One of the inducements in planting walnut forests and adding blue grass and making a pasture, was that there would be no danger of fire. The leaves and stems of the walnut trees quickly assimilate with the soil.

When a natural forest is grazed, the cattle destroy much of the young growth, and my company is fencing our woodlands as rapidly as possible. The preserving of seed trees, together with fencing, will let nature do much to increase growth of present forests. Then reduce the cutting of timber to something below the annual growth, and a good beginning will have been made to restore Kentucky forests to their original glory. Besides this, there are tens of thousands of acres of cleared land in Kentucky that should be returned to the forest. Let the farmer select ten to twenty acres of medium good land and plant it in walnuts and blue grass. A better or more profitable combination could not exist. On poor land,

plant the black locust, and presently be possessed of a perpetual woodlot. On meadow lands plant *catalpa speciosa*, and again have a perpetual and quick growing forest.

Kentucky has too much land in so-called cultivation. Half the acres, well cultivated, would bring larger and better crops than are now secured. Hence the planted woodlots could be spared.

In 1907 there was cut from Kentucky forests 912,000,000 feet, board measure. If the annual growth of our forests is no greater than the average of the entire country, thirteen cubic feet to the acre, or 156,000,000 cubic feet for the 12,000,000 acres of forest land in the state, it would indicate that we cut over three times the annual growth. The cut of 1907 was an increase of thirty-eight per cent over that of 1906. During the past twenty-seven years Kentucky is credited with a cut of 14,531,000,000 feet, board measure, or an average of 538,000,000 per year.

To sum up the case: Forests are necessary to life and civilization. Kentucky has about half its area still covered with forests, and is in better condition to retain its present acreage and increase the annual growth than most of the states of our country. We are a patriotic people, but patriotism alone will not increase the production of our forests or add to its acreage. Legislation is required. If the commonwealth of Kentucky can protect its quail, it can protect its trees. We have not yet been awake long enough to the great problem before us that must be met in the near future, to know what is best. We do know that a tree planted is an added guarantee to continued civilization, but we have yet to study what inducements are needed to plant the tree and protect and increase the forests we already have.

Not only is Kentucky interested in solving the problem, which will tax the best minds in the commonwealth and the nation. Our mountain forests are the watersheds of great rivers, and aid

in regulating the flow of streams, and preventing the erosion of the soil. Every citizen of our country is interested.

Kentucky has about 12,000,000 acres in forest lands, which is about one-half the acreage of the state. It is not possible to get from the books the assessed value of forest land, but the value of all lands in Kentucky for 1907 was assessed at \$12.60 per acre. On this valuation the forest land would show a value of \$150,000,000. An assessment for state and county purposes of one per cent on this yields a revenue of \$1,500,000, or a tax of \$0.12½ per acre.

The cut of timber for 1907 was a little over 912,000,000 feet, board measure, valued at \$19,000,000. If this value of the timber cut had been taxed

eight per cent, it would about equal the revenue derived from the \$0.12½ per acre.

I believe the theory of free forests and revenue from the product of the forest may aid in the solution of the tax question. Then the man who plants trees would have an inducement. He would not be taxed on his growing crop until he sold his trees. The owner of forest lands would not be apt to cut immature trees, but await mature growth. One thing the American people may well understand at once—there will never be cheap lumber again. A people that cuts three feet to one that grows, as at present, will require generations of skilled forest management to increase the annual growth of the forests to meet the wants of civilized life.

AMERICANS AND AMERICAN TREES IN GERMANY

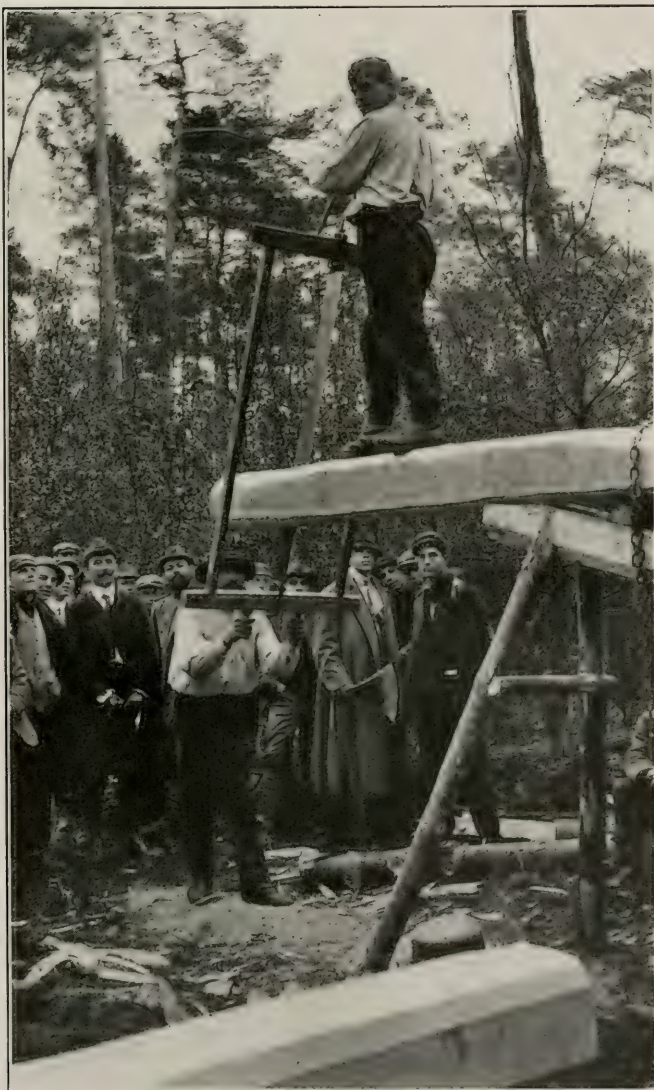


Heavy snowbreak in Douglas fir near Hamburg

AMERICANS AND AMERICAN TREES IN GERMANY

A SERIES OF PICTURES

By HOWARD R. KRINBILL, Assistant, Biltmore Forest School,
Winter Quarters, 1909-10, Germany



Sawing Scotch pine railroad ties in Mitteldick Forest. One man hews and saws ten ties daily at seventeen cents each. An American holds the hewing axe

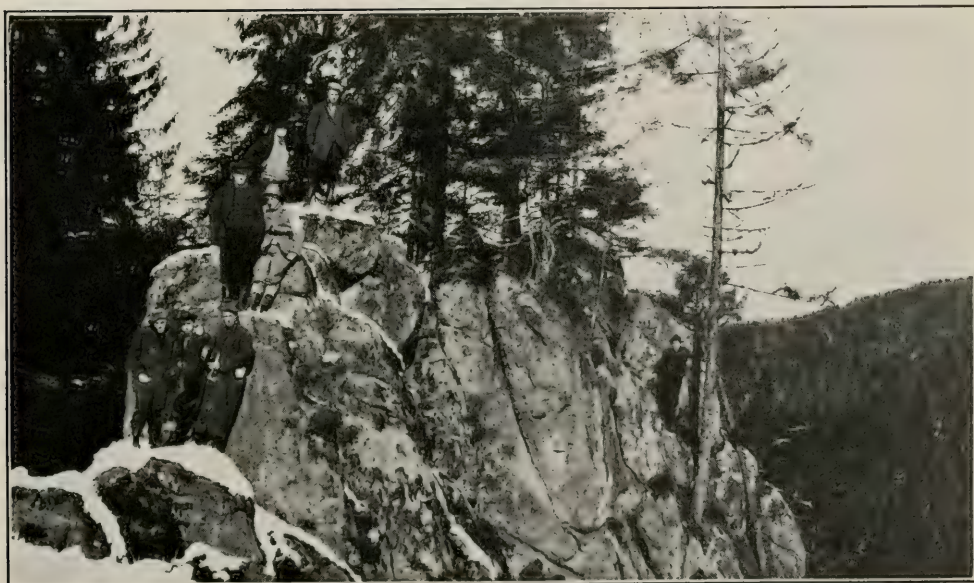


SCOTCH PINE TIES, MITTELDICK FOREST

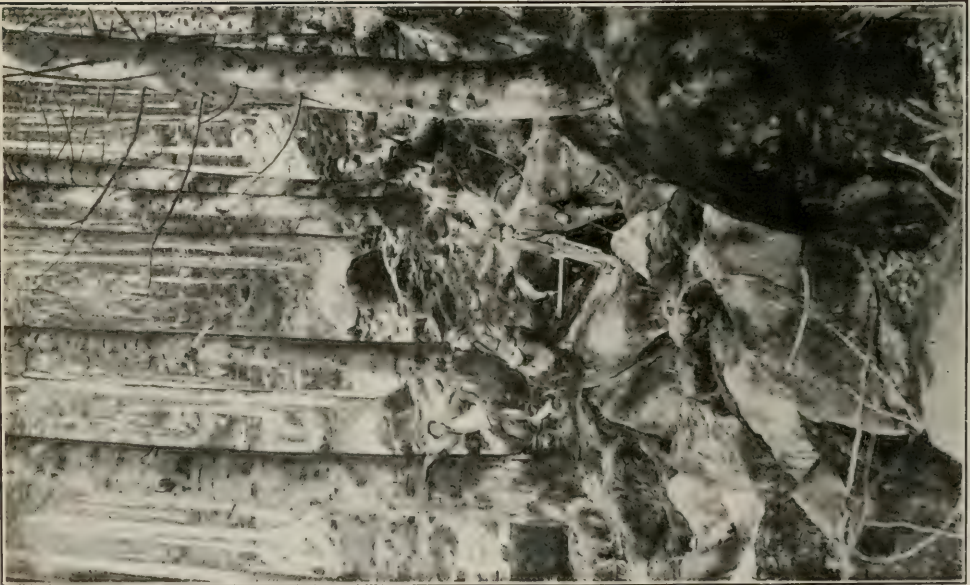
Dimensions, $6\frac{1}{2}$ in. by 10 in. by $8\frac{1}{2}$ feet. Value, \$1.20 to \$1.44 each. These pine ties do not require creosoting, as they consist chiefly of heart wood



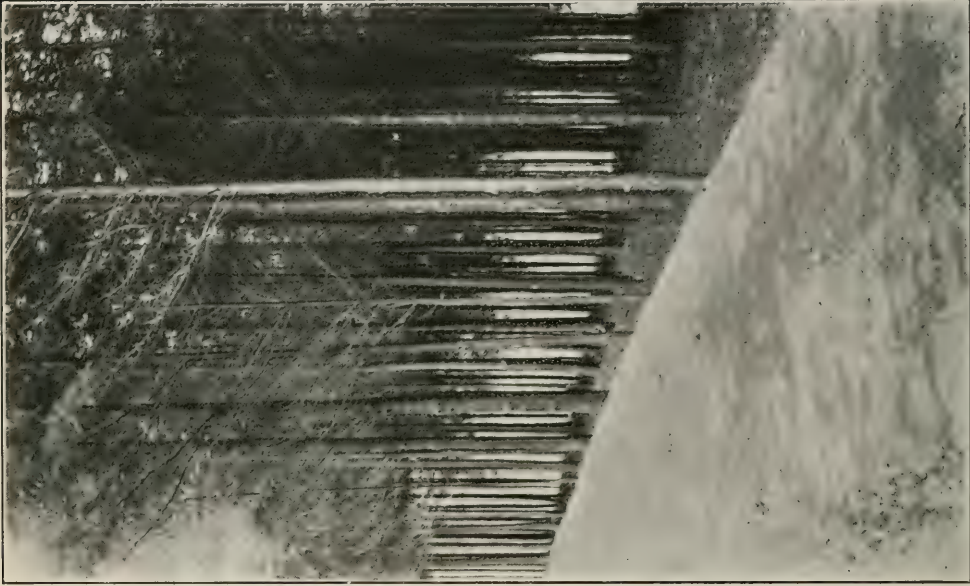
Americans cruising in the Black Forest. The forty students composing the Biltmore School were divided into four parties, each being assigned a large tract of fir and spruce



Cruising party looking over the tract and "thinking" before beginning strip estimates



Caliper men, chain man and tally man among the firs and spruces of the Black Forest



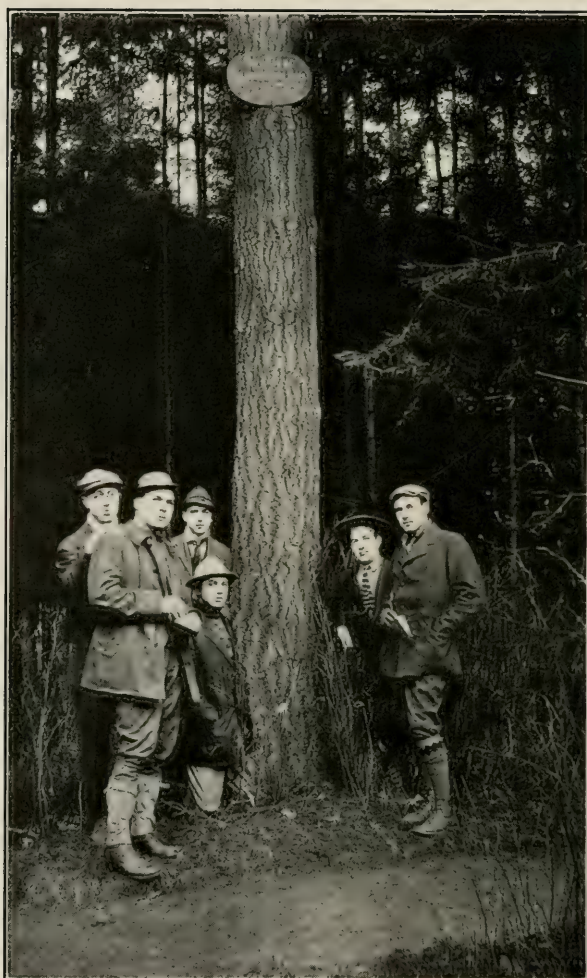
Douglas fir, Experimental plot in Heidelberg Forest. Twenty- \times years old; Sixty-two cords per acre. Outplanted at three years of age. Adjoining are plots of other American trees



Lifting machine in the Odenwald. The Americans are in the background inspecting methods of transplanting. Eight thousand two-year-old Scotch pine are outplanted per acre at a cost of \$16, the seedlings costing 15 cents per thousand



Transplanting machine in the Odenwald. One man and four girls transplant 18,000 seedlings daily



Douglas fir, 45 years old, 20 inches diameter breast high, on private estate of 6,000 acres in the Odenwald

THE WEEKS BILL IN CONGRESS

The Story of Its Passage in the House of the Sixty-first Congress, and of the Senate Filibuster

IN THIS magazine (then known as *Conservation*) for May, 1909, there was published a brief history of "The Fight for the Appalachian Forests," bringing the story up to that time, and closing with this statement: "The issue is now clearly before Congress and the country. It rests on the vital principle of conservation of natural resources, and will not down. The people have unmistakably asked for legislation on this subject. They will demand it of the Sixty-first Congress."

The first session of the Sixty-first Congress has closed, and it is possible now to write another chapter of this history—unfortunately, not the final one.

Mr. Weeks took his bill which had been before the last Congress and eliminated one or two features which, while they seemed wise to him, were unimportant and made enemies for the bill—especially the provision designating the income from the national forests as the source of the funds for purchasing the new forests. This modified bill, agreed to by the best friends of the proposed legislation in both houses, was introduced during the extra session in the House by Mr. Weeks, and in the Senate by Senator Gallinger. In both bodies it was referred to the committees on agriculture, but the Senate reference was later changed to the committee on forest reservations, the committee which had previously had charge of it, and of which Senator Brandegee of Connecticut is chairman. The Connecticut senator had been subjected to some criticism at home for lack of interest in this bill and was quite ready to take it into his committee and assume charge of it,

The policy of the senators was, however, to await the action of the House—a policy that proved to be a tactical mistake, however good the reasons may have been for it. It produced a feeling in the country outside, where interest in the bill was keen, that the Senate's interest in it was perfunctory. The senators who were most actively enlisted for the bill, however, gave assurance that the bill could be reported and passed in that body at any time. The statement was repeatedly made, up to the last hours of the session, "We have the votes." The policy of delay was encouraged by the President, who wished the bill to wait until what he regarded as the more urgent administration measures were disposed of.

Meanwhile, action dragged in the House. The members of the committee on Agriculture were known to be divided eight to seven, with three new members whose position was unknown. Of the seven one was Chairman Scott, an uncompromising enemy of the bill, who would do everything within the limit of the law to defeat it. The committee did not find time for the hearing that had been asked for on the bill until February 23. This resolved itself largely into a discussion by experts, chiefly Professors Swain, Roth, and Glenn, of the pronouncements of Willis L. Moore, chief of the Weather Bureau, and certain officers of the Engineer Corps, in regard to the influence of forests upon streamflow. So effective were the attacks upon the views of these officials that they were given an opportunity to appear before the committee on the 1st and 2d of March to defend their own position.

Reports of these discussions and papers more fully presenting the case, were published in this magazine in March and April, and it is not necessary to review them at this time.

Some time elapsed without any further action being taken by the committee. Finally, a vote was taken and all of the new members voted for the bill, making the standing of the committee eleven for and seven against. It is interesting to note in this connection that the advocates of this measure have never failed to convince a majority of any committee they have appeared before in either house that the measure is a good one and should become a law.

Within a few days of the action by the committee, the report of the majority, which had been put in charge of Mr. Lever of South Carolina and Mr. Plumley of Vermont, was ready to submit to the House, but that of the minority was delayed several days. This was in charge of Chairman Scott, and his reason for the delay was pressure of other work, but every day's delay hindered the passage of the bill, which Mr. Scott was certainly not anxious to further.

There are many times in the course of legislation when a minority can be just as effective as a majority, if obstruction is all that is needed.

On the 15th of April, the report was made and committed to the committee of the whole house on the state of the Union and ordered to be printed. It was then hoped that an early opportunity would come to bring it up on calendar Wednesday, when, under the rules, each committee in turn has an opportunity to call up bills for consideration. It soon developed, however, that the turn of agriculture on the calendar had passed and was not likely to come again, owing to the number of important bills to come from other committees that had the call before it.

The friends of the bill outside of Congress meanwhile grew anxious, and appeals for action began to pour in upon the members, especially those from the New England states. It had become evident that the only hope for

action was in a special rule, which must be obtained from the new rules committee of ten. It was no longer a question of securing the consent of the Speaker, who is not even a member of the new committee. Of the ten members only one, Mr. Lawrence of Massachusetts, was in favor of the bill, but so well was the case urged by Mr. Weeks, Mr. Lawrence, Mr. Currier, Mr. Lever, and their supporters, that the committee consented to bring in a rule.

Even then so much business intervened that days passed before the rule was reported, and it was not until the afternoon of June 24 that Mr. Smith of Iowa introduced the rule for the committee and yielded the floor to Mr. Lawrence of Massachusetts, who made an admirable speech, brief, clear, and pointed, in support of the rule and the bill. Concluding, he said:

It would be interesting to consider at length just what is being done for the preservation and development of forests in France, Italy, Switzerland, Austria, Great Britain, Sweden, Norway, Denmark, Germany, and Japan. Such consideration would convince us that America has been very slow to realize the importance of this work. We are much behind other first-class countries.

But we are waking up, and the passage of this bill will be a long step forward. I wish it might have carried a larger appropriation and provided for work covering a longer period. Its advocates, however, are sure that the expenditure here provided for will remove all doubt as to the wisdom of the policy and that it will be followed by much larger appropriations, which will permit more rapid and thorough development. This is practical conservation. It proposes to save what the people want saved, and the proposition should receive the hearty and unanimous support of the members of this house.

The rule was adopted on a roll call, 154 voting in favor of consideration and ninety-nine against. Twenty-two answered present, and 114 did not vote. Several opponents of the bill were fair enough to vote for its consideration, but others fought the measure even at this point, and Mr. Rucker of Missouri began the dilatory tactics with which he endeavored up to the final passage of the bill to obstruct it and to tire out

the House. Conference reports also intervened, and it was late in the afternoon of a very hot day when the bill finally came up in committee of the whole. Mr. Rucker continued his dilatory tactics, but Mr. Weeks and Mr. Lever held control of the committee and of the House through it all, and to Mr. Weeks, when he was given the floor by Mr. Lever, to speak for the bill which has been known by his name and to which he has given so much patient effort, diplomacy, and parliamentary skill, was accorded the rare tribute of genuine applause from all over the house.

Following his brief and straightforward statement, an attempt was made to put the matter over until the following day, but the men who had determined to pass that bill could not be shaken, and it was only when an agreement to go on in the evening was secured that a recess was taken until eight o'clock.

A large number of members took part in the general debate and in the debate under the five-minute rule. The principal argument against the bill was by Mr. Scott of Kansas, chairman of the committee on agriculture. Mr. Scott based his objections chiefly upon the allegation, which he claimed was supported by the most competent engineering testimony, that the forests at the headwaters of streams do not exercise any appreciable effect upon the navigability of the streams. Mr. Scott reached this conclusion by the simple and convenient intellectual process of eliminating all conflicting testimony and accepting only that which fitted his prejudice.

Mr. Tawney of Minnesota discovered a peril to the structure of our government in the make-up of the commission under the bill, in that it included members of the executive and legislative branches, thus transgressing the complete separation decreed by the fathers.

A point made much of in the House debate and by Senator Burton in his filibuster in the Senate, was the fact that the bill was brought forward in the closing hours of the session and

an attempt made to rush it through without adequate discussion. This taunt came with bad grace from the men who for years have used every means in their power to prevent the consideration of this or the similar measures that preceded it, and have only yielded when they were fought to a finish by a majority that was the final product of ten years of extraordinarily full discussion in Congress and outside, years in which several official government investigations have been made by Congress, resulting in reports which have been available in printed form for varying periods of time.

If there was not sufficient information, and if there had not been sufficient discussion, these opponents of the bill were the responsible parties, and the ignorance which they claim argues their own failure to do their duty in considering a great public measure. There has been no desire on the part of its friends to hold it back. The truth is that the opponents of the bill were driven to the last resort of opposition in fighting a plan which had ample precedent and ample warrant in the history of our governmental activities, and was so strong that it could only be beaten by delay. They had found arguments against it, not by a survey of all the evidence, but by choosing their own witnesses and belittling those on the opposite side. The speakers in opposition to the bill were, beside Mr. Scott and Mr. Rucker: Mr. Englebright of California, Mr. Howland of Ohio, Mr. Beall of Texas, Mr. Parker of New Jersey, Mr. Sims and Mr. Garrett of Tennessee, Mr. Crumpacker and Mr. Cox of Indiana, Mr. Focht of Pennsylvania, Mr. Southwick of New York, and Mr. Tawney of Minnesota.

The general character of the speeches for the bill was of a higher order. The speeches were more dignified, dealing with facts rather than with abuse of the other side, and always holding steadily to one purpose, to make the strongest possible case for the bill. The closing word for the bill in general debate was a brief, clear, snappy speech by Mr. Lever of South Carolina, who had

charge of the bill for the majority of the committee on agriculture. Those who spoke in favor of the bill, in addition to those who have already been mentioned, were: Mr. Currier of New Hampshire, Mr. Guernsey of Maine, Mr. Small of North Carolina, Mr. Burnett of Alabama, Mr. McCall of Massachusetts, Mr. Austin of Tennessee, Mr. Keliher of Massachusetts, Mr. Thomas of North Carolina, Mr. Cole of Ohio, Mr. Tilson of Connecticut, Mr. Tirrell of Massachusetts, Mr. Gillett of Massachusetts, Mr. Fordney of Michigan, Mr. Mann of Illinois, Mr. Keifer of Ohio, Mr. Saunders of Virginia, and Mr. Davis of Minnesota.

It was late in the evening when debate ended and voting began. Mr. Rucker of Missouri, tenacious in his hopeless attempt at delay, moved to recommit the bill to the committee, and

a roll call had to be taken on this motion, which was defeated by a vote of 112 yeas to 131 nays, with seventeen present and 129 not voting.

It was midnight when the final roll call on the passage of the bill ended and the result was declared, the bill having passed the House by 130 to 111. It had been a strong and courageous fight, in the face of odds and of the most determined opposition. At the same time, it detracts in no respect from the work done by members in the House to say that they would never have done it except in response to the vigorous expression of a widespread public demand for the passage of some measure that would make it possible to check the destruction of the forests of the Appalachian system, north and south. The vote is given below in detail, with an analysis:

THE ROLL CALL

The vote on the Weeks Bill in the House of Representatives, June 24, 1910, was as follows (this is a direct transcript from the *Congressional Record*):

YEAS—130

Ames
Austin
Anthony
Bell, Ga.
Bennett, N. Y.
Bingham
Borland
Boutell
Burke, S. Dak.
Burleigh
Burnett
Byrns
Calder
Cary
Cocks, N. Y.
Cole
Conry
Cooper, Wis.
Coudrey
Covington
Craig
Currier
Davidson
Davis
Denby
Dodds
Driscoll, D. A.
Durey
Ellerbee

Esch
Estopinal
Finley
Fish
Fordney
Fornes
Foss, Ill.
Foss, Mass.
Foster, Vt.
Foulkrod
Gaines
Gallagher
Gardner, Mass.
Gardner, N. J.
Gill, Md.
Gill, Mo.
Gillett
Graff
Graham, Ill.
Grant
Greene
Griest
Guernsey
Hamilton
Havens
Heald
Heflin
Higgins
Hill

Hitchcock
Hubbard, W. Va.
Hughes, N. J.
Hull, Tenn.
Johnson, S. C.
Keifer
Keliher
Kinkaid, Nebr.
Kinkead, N. J.
Kustermann
Lamb
Law
Lawrence
Lenroot
Lever
Loud
Loudenslager
Lundin
McCall
McDermott
McKinney
McLachlan, Cal.
McLaughlin, Mich.
Madison
Maguire, Nebr.
Mann
Maynard
Moon, Tenn.
Morehead

Morgan, Mo.
Morgan, Okla.
Murdock
Needham
Nelson
Nicholls
Norris
O'Connell
Olcott
Padgett
Palmer, A. M.
Plumley
Poindexter
Pou
Pratt
Raine
Ransdell, La.
Reynolds
Roberts
Robinson
Rodenberg
Saunders
Sharp
Sheffield
Slomp
Small
Sterling
Sturgiss
Sulloway

Taylor, Ala.
Thomas, N. C.
Tilson
Turnbull

Wanger
Washburn
Watkins
Webb

Weeks
Wickliffe
Wilson, Ill.
Wilson, Pa.

Wood, N. J.
Young, N. Y.

NAYS—III

Adamson
Aiken
Alexander, Mo.
Barchfeld
Bartlett, Nev.
Beall, Texas
Booher
Bradley
Brantley
Burgess
Burleson
Calderhead
Campbell
Carlin
Cassidy
Chapman
Clark, Mo.
Cline
Collier
Cox, Ind.
Crow
Crumpacker
Cullop
Dalzell
Dawson
Denver
Dickinson
Dies

Dixon, Ind.
Driscoll, M. E.
Dwight
Edwards, Ga.
Ellis
Englebright
Fassett
Flood, Va.
Flood, Ark.
Focht
Foster, Ill.
Fuller
Gardner, Mich.
Garner, Texas
Garrett
Goebel
Good
Gordon
Graham, Pa.
Hamer
Hamlin
Hammond
Hardy
Hawley
Hay
Helm
Henry, Texas
Hollingsworth

Houston
Howard
Howell, Utah
Howland
Hubbard, Iowa
Hughes, Ga.
Humphrey, Wash.
James
Johnson, Ky.
Johnson, Ohio
Joyce
Kendall
Kennedy, Iowa
Knapp
Korbly
Lloyd
McCreary
McKinley, Ill.
Macon
Malby
Martin, Colo.
Mays
Miller, Minn.
Millington
Moore, Texas
Morrison
Moss
Murphy

Oldfield
Olmsted
Parker
Payne
Pickett
Randell, Texas
Rauch
Roddenbery
Rucker, Mo.
Scott
Sheppard
Sherley
Simmons
Sisson
Smith, Cal.
Southwick
Stafford
Steenerson
Stevens, Minn.
Tawney
Taylor, Colo.
Taylor, Ohio
Thomas, Ky.
Thomas, Ohio
Tou Velle
Volstead
Woods, Iowa

ANSWERED "PRESENT"—13

Carter
Douglass
Gillespie
Goldfogle

Hardwick
Hayes
Kennedy, Ohio

Langley
Sabath
Smith, Iowa

Sparkman
Spight
Tirrell

NOT VOTING—136

Adair
Alexander, N. Y.
Allen
Anderson
Andrus
Ansberry
Ashbrook
Barclay
Barnard
Barnhart
Bartholdt
Gilmore
Glass
Godwin
Goulden
Gregg
Gronna
Hamill
Hanna
Harrison
Haugen
Henry, Conn.

Hinshaw
Hobson
Howell, N. J.
Huff
Hughes, W. Va.
Hull, Iowa
Humphreys, Miss.
Jamieson
Jones
Kahn
Kitchin
Knowland
Bartlett, Ga.
Bates
Bennett, Ky.
Boehne
Bowers
Broussard
Brownlow
Burke, Pa.
Butler
Byrd

Candler
Kopp
Kronmiller
Lafean
Langham
Latta
Lee
Legare
Lindbergh
Lindsay
Livingston
Longworth
Lowden
McCredie
McGuire, Okla.
McHenry
McKinlay, Cal.
McMorran
Madden
Martin, S. Dak.
Miller, Kans.
Mondell

Moon, Pa.
Moore, Pa.
Cantrill
Capron
Clark, Fla.
Clayton
Cook
Cooper, Pa.
Cowles
Cox, Ohio
Cravens
Creager
Dent
Morse
Moxley
Mudd
Nye
Page
Palmer, H. W.
Parsons
Patterson
Pearre

Peters	Sherwood	Garner, Pa.	Thistlewood
Pray	Sims	Slayden	Townsend
Prince	Dickson, Miss.	Smith, Mich.	Underwood
Pujo	Diekema	Smith, Texas	Vreeland
Reeder	Draper	Snapp	Wallace
Reid	Edwards, Ky.	Sperry	Weisse
Rhinock	Elvins	Stanley	Wheeler
Richardson	Fairchild	Stephens, Texas	Wiley
Riordan	Ferris	Sulzer	Willett
Rothermel	Fitzgerald	Swasey	Woodyard
Rucker, Colo.	Foelker	Talbott	Young, Mich.
Shackleford	Fowler	Tener	The Speaker

So the bill was passed.

The following additional pairs were announced:

Until further notice: Mr. Bradley with Mr. Goulden.

On this vote: Mr. Clark of Florida, in favor, with Mr. Sims, against; Mr. Sulzer, in favor, with Mr. Boehne, against; Mr. Morse, in favor, with Mr. Slayden, against; Mr. Swasey, in favor, with Mr. Byrd, against; Mr. Diekema, in favor, with Mr. Vreeland, against; Mr. Kronmiller with Mr. Sabath.

Mr. Spight—Mr. Speaker, I wish to know if the gentleman from Connecticut (Mr. Henry) is recorded on this vote.

The Speaker—He is not.

Mr. Spight—I voted "No" with the understanding that the gentleman from Connecticut (Mr. Henry) would vote for this bill if he were present, and I thought he was going to vote for it. I want to withdraw my vote and answer "Present."

Mr. Tirrell—Mr. Speaker, I would inquire if the gentleman from North Carolina (Mr. Kitchin) is recorded?

The Speaker—He is not.

Mr. Tirrell—I withdraw my vote and answer "Present."

The result of the vote was announced as above recorded.

On motion of Mr. Lever, a motion to reconsider the vote by which the bill was passed was laid on the table.

THE INDIVIDUAL RECORD BY STATES

Below are given the individual records of the representatives, arranged by states and districts. The figure preceding each name is the number of the congressional district of the member. The index numbers following each name have the following meanings:

¹Voted YES in the Sixtieth Congress.

²Voted No in the Sixtieth Congress.

³Did not vote in the Sixtieth Congress.

⁴New member; predecessor voted YES.

⁵New member; predecessor voted No.

⁶New member; predecessor did not vote.

Names in italics are those of Democrats.

ALABAMA

<i>Yes</i>	<i>No</i>	<i>Not voting</i>
1. <i>G. W. Taylor</i> ³		2. <i>Stanley H. Dent, Jr.</i> ⁴
4. <i>William B. Craig</i> ¹		3. <i>Henry D. Clayton</i> ²
5. <i>James T. Heflin</i> ¹		6. <i>R. P. Hobson</i> ¹
7. <i>John L. Burnett</i> ¹		8. <i>W. Richardson</i> ¹
		9. <i>O. W. Underwood</i> ²

ARKANSAS

6. <i>J. T. Robinson</i> ¹	1. <i>Robert B. Macon</i> ²	4. <i>Ben Cravens</i> ³
	2. <i>W. A. Oldfield</i> ⁴	5. <i>Charles C. Reid</i> ²
	3. <i>John C. Floyd</i> ³	7. <i>R. M. Wallace</i> ²

CALIFORNIA

6. J. C. Needham²
7. James McLachlan¹

1. W. F. Englebright²
8. S. C. Smith²

2. D. E. McKinlay²
3. J. R. Knowland²
4. Julius Kahn³
5. E. A. Hayes^{2*}

*Present

COLORADO

- At large—*E. T. Taylor*⁵
2. *John A. Martin*⁵

1. *A. W. Rucker*⁵

CONNECTICUT

- At large—*John Q. Tilson*⁴
3. *Edwin W. Higgins*¹
4. *Ebenezer J. Hill*¹

1. *E. S. Henry*^{1*}
2. *N. D. Sperry*¹

*Paired with a negative vote

DELAWARE

- At large—*W. H. Heald*⁴

FLORIDA

3. *D. H. Mays*⁶

1. *S. M. Sparkman*^{3*}
2. *Frank Clark*⁴

*Present

GEORGIA

9. *Thomas M. Bell*¹

1. *C. G. Edwards*²
2. *S. A. Roddenbery*⁶
3. *D. M. Hughes*⁵
4. *W. C. Adamson*³
8. *W. M. Howard*²
11. *W. G. Brantley*²

5. *L. F. Livingston*³
6. *C. F. Bartlett*²
7. *Gordon Lee*¹
10. *T. W. Hardwick*²

IDAHO

- At large—*Thomas R. Hamer*⁵

ILLINOIS

2. *James R. Mann*¹
3. *William W. Wilson*²
4. *James T. McDermott*³
7. *Fred Lundin*⁵
8. *Thomas Gallagher*⁵
9. *H. S. Boutell*⁸
10. *George E. Foss*²
14. *James McKinney*¹
16. *Joseph V. Graft*²
17. *John A. Sterling*³
20. *Henry T. Rainey*¹
21. *James M. Graham*⁶
22. *William A. Rodenberg*³

12. *Charles E. Fuller*¹
19. *William B. McKinley*²
23. *Martin D. Foster*²
24. *Pleasant T. Chapman*²

1. *M. B. Madden*²
5. *A. J. Sabbath*^{2*}
6. *William J. Moxley*⁵
11. *H. M. Snapp*²
13. *F. O. Lowden*²
15. *George W. Prince*¹
18. *Joseph G. Cannon*³
25. *Napoleon B. Thistlewood*²

*Present.

INDIANA

2. *W. A. Cullop*⁵
3. *Willis E. Cox*²
4. *Lincoln Dixon*²
5. *Ralph W. Moss*⁵
7. *C. A. Korbly*⁵
9. *M. A. Morrison*⁴
10. *E. D. Crumpacker*²
11. *G. W. Rauch*²
12. *Cyrus Cline*⁴

1. *J. W. Boehne*⁴
6. *W. O. Barnard*⁶
8. *J. A. M. Adair*³
13. *H. A. Barnhart*²

AMERICAN FORESTRY

IOWA

- | | |
|-----------------------------------|---------------------------------------|
| 1. C. A. Kennedy ² | 4. G. N. Haugen ² |
| 2. A. F. Dawson ² | 7. J. A. T. Hull ¹ |
| 3. C. E. Pickett ⁵ | 8. <i>W. D. Jamieson</i> ⁴ |
| 5. James W. Good ² | 9. W. I. Smith ^{3*} |
| 6. Nathan E. Kendall ² | |
| 10. Frank P. Woods ⁵ | *Present |
| 11. E. H. Hubbard ² | |

KANSAS

- | | | |
|------------------------------------|----------------------------------|------------------------------|
| 1. D. R. Anthony, Jr. ³ | 2. Charles F. Scott ² | 4. J. M. Miller ² |
| 7. E. H. Madison ¹ | 3. P. P. Campbell ² | 6. W. A. Reeder ¹ |
| 8. Victor Murdock ² | 5. W. A. Calderhead ³ | |

KENTUCKY

- | | |
|--|--|
| 1. <i>Ollie M. James</i> ³ | 2. <i>A. O. Stanley</i> ¹ |
| 3. <i>R. Y. Thomas, Jr.</i> ⁶ | 6. <i>J. L. Rhinock</i> ³ |
| 4. <i>Ben Johnson</i> ² | 7. <i>James C. Cantrill</i> ⁴ |
| 5. <i>S. Sherley</i> ² | 9. J. B. Bennett ¹ |
| 8. <i>Harvey Helm</i> ² | 10. J. W. Langley ^{1*} |
| | 11. D. C. Edwards ¹ |

*Present. Paired with Bartlett of Georgia

LOUISIANA

- | | |
|--|--|
| 1. <i>A. Estopinal</i> ¹ | 2. <i>S. L. Gilmore</i> ⁶ |
| 4. <i>J. T. Watkins</i> ¹ | 3. <i>R. F. Broussard</i> ³ |
| 5. <i>J. E. Ransdell</i> ¹ | 7. <i>A. P. Pujó</i> ² |
| 6. <i>R. C. Wickliffe</i> ⁴ | |

MAINE

- | | |
|---------------------------------|-------------------------------|
| 3. E. C. Burleigh ¹ | 1. A. L. Allen ¹ |
| 4. F. E. Guernsley ⁴ | 2. J. P. Swasey ^{4*} |

*Paired with a negative vote

MARYLAND

- | | |
|--|---|
| 1. <i>J. H. Covington</i> ⁶ | 2. <i>J. F. C. Talbott</i> ¹ |
| 4. <i>John Gill, Jr.</i> ¹ | 3. J. Kronmiller ⁶ |
| | 5. S. E. Mudd ¹ |
| | 6. George A. Pearre ³ |

MASSACHUSETTS

- | | |
|---|--------------------------------------|
| 1. G. P. Lawrence ¹ | 4. C. Q. Tirrell ^{1*} |
| 2. F. H. Gillett ¹ | 11. <i>A. J. Peters</i> ¹ |
| 3. C. G. Washburn ¹ | |
| 5. Butler Ames ³ | *Paired with a negative vote |
| 6. A. P. Gardner ¹ | |
| 7. E. W. Roberts ¹ | |
| 8. S. W. McCall ¹ | |
| 9. <i>J. A. Keliher</i> ¹ | |
| 10. <i>J. F. O'Connell</i> ¹ | |
| 12. John W. Weeks ¹ | |
| 13. W. S. Greene ¹ | |
| 14. <i>Eugene N. Foss</i> ⁴ | |

MICHIGAN

- | | | |
|-------------------------------------|------------------------------------|---------------------------------|
| 1. Edwin Denby ¹ | 3. Washington Gardner ² | 2. C. E. Townsend ¹ |
| 4. Edward L. Hamilton ¹ | | 5. G. J. Diekema ^{1*} |
| 8. Joseph W. Fordney ² | | 6. Samuel W. Smith ³ |
| 9. James C. McLaughlin ¹ | | 7. H. McMorran ¹ |
| 10. George A. Loud ⁴ | | 12. H. O. Young ² |
| 11. Francis H. Dodds ⁴ | | |

*Paired with a negative vote

MINNESOTA

3. Charles R. Davis¹

1. James A. Tawney²
2. *W. S. Hammond*²
4. F. C. Stevens²
7. A. J. Volstead²
8. Clarence B. Miller⁴
9. Halvor Steenerson²

5. F. M. Nye²
6. C. A. Lindbergh²

MISSISSIPPI

4. *T. U. Sisson*⁵
8. *J. W. Collier*⁸

1. *E. S. Candler, Jr.*¹
2. *Thomas Spight*^{2*}
3. *B. G. Humphreys*¹
5. *Adam M. Byrd*³
6. *Eaton J. Bowers*²
7. *William A. Dickson*⁸

*Paired with affirmative vote

MISSOURI

5. *W. P. Borland*⁵
11. *Patrick F. Gill*⁴
12. Harry M. Coudrey¹
15. Charles H. Morgan⁵

1. *James T. Lloyd*²
2. *William W. Rucker*²
3. *James W. Alexander*²
4. *Charles F. Booher*²
6. *C. A. Dickinson*⁵
7. *Courtney W. Hamlin*²
9. *Champ Clark*²
14. Charles A. Crow⁵
16. Arthur P. Murphy⁶

8. *D. W. Shackelford*²
10. Richard Bartholdt¹
13. Politte Elvins⁶

MONTANA

Charles N. Pray³

NEBRASKA

1. *John A. Maguire*⁴
2. *Gilbert M. Hitchcock*¹
5. George W. Norris³
6. Moses P. Kinkaid¹

3. *James P. Latta*⁵
4. E. H. Hinshaw¹

NEVADA

At large—*G. A. Bartlett*³

NEW HAMPSHIRE

1. C. A. Sulloway¹
2. Frank D. Currier¹

NEW JERSEY

1. H. C. Loudenslager²
2. J. J. Gardner¹
4. Ira W. Wood¹
6. *William Hughes*¹
9. *E. F. Kinkead*⁶

7. R. W. Parker²

3. B. F. Howell²
5. C. N. Fowler²
8. William H. Wiley⁴
10. *James A. Hamill*³

NEW YORK

1. William W. Cocks¹
4. Charles B. Law¹
5. Richard Young⁴
6. William M. Calder¹
11. *Charles W. Fornes*¹
12. *Michael F. Conry*⁴
15. J. V. V. Olcott³

20. T. W. Bradley³
23. G. N. Southwick²
26. George R. Malby²
27. C. S. Millington⁵
28. Charles L. Knapp³
29. M. E. Driscoll²
30. J. W. Dwight²

2. *George H. Lindsay*³
3. Otto G. Foelker¹
7. *J. J. Fitzgerald*²
8. *D. J. Riordan*³
9. *H. M. Goldfogle*^{1*}
10. *William Sulzer*^{1†}
13. Herbert Parsons¹

NEW YORK—Continued

17. W. S. Bennet¹
21. Hamilton Fish⁶
25. Cyrus Durey²
32. James S. Havens⁴
35. D. A. Driscoll¹

31. Sereno E. Payne²
33. J. S. Fassett²
34. J. S. Simmons⁴

14. William Willett, Jr.¹
16. F. B. Harrison¹
18. Joseph A. Goulden³
19. John E. Andrus²
22. William H. Draper¹
24. G. W. Fairchild²
36. De A. S. Alexander³
37. E. B. Vreeland^{2†}

*Present

†Paired with a negative vote

‡Paired with an affirmative vote

NORTH CAROLINA

1. John H. Small[†]
3. Charles R. Thomas¹
4. Edward W. Pow¹
5. John M. Morehead⁶
9. Edwin Y. Webb¹
10. John G. Grant⁴

2. Claude Kitchin^{2‡}
6. H. L. Godwin¹
7. Robert N. Page¹
8. Charles H. Cowles⁵

‡Paired with an affirmative vote

NORTH DAKOTA

At large—A. L. Gronna²
At large—L. B. Hanna⁶

OHIO

7. J. Warren Keifer²
8. Ralph D. Cole¹
14. William G. Sharp⁶

2. Herman P. Goebel²
4. William E. Tou Velle²
6. Matthew R. Denver¹
10. Adna R. Johnson⁶
12. Edward L. Taylor, Jr.¹
15. James Joyce³
16. David A. Hollingsworth⁶
19. William A. Thomas¹
20. Paul Howland²
21. James H. Cassidy⁶

1. Nicholas Longworth¹
3. James M. Cox¹
5. T. T. Ansberry³
9. I. R. Sherwood²
11. Albert Douglas^{1*}
13. C. C. Anderson⁶
17. W. A. Ashbrook¹
18. James Kennedy^{1*}

*Present

OKLAHOMA

2. Dick T. Morgan⁶

1. Bird McGuire²
3. Charles E. Creager⁵
4. Charles D. Carter²
5. Scott Ferris²

OREGON

1. Willis C. Hawley²
2. William R. Ellis²

PENNSYLVANIA

1. Harry H. Bingham²
5. William W. Foulkrod¹
8. Irving P. Wanger³
9. William W. Griest⁴
10. Thomas D. Nicholls¹
14. Charles C. Pratt⁶
15. William B. Wilson²

6. George D. McCreary²
17. Benjamin K. Focht³
18. M. E. Olmsted³
29. William H. Graham³
30. John Dalzell²
32. A. J. Barchfeld²

2. Joel Cook¹
3. J. Hampton Moore²
4. Reuben O. Moon³
7. Thomas S. Butler²
11. Henry W. Palmer⁴
12. Alfred B. Garner⁶
13. John H. Rothermel²

PENNSYLVANIA—Continued

19. John M. Reynolds¹
26. A. M. Palmer⁴

16. John G. McHenry²
20. Daniel F. Lafean³
21. Charles F. Barclay²
22. George F. Huff²
23. Allen F. Cooper¹
24. John K. Tener⁴
25. Arthur L. Bates¹
27. John N. Langham⁶
28. Nelson P. Wheeler²
31. James F. Burke³

RHODE ISLAND

1. W. P. Sheffield⁶

2. A. B. Capron¹

SOUTH CAROLINA

4. J. T. Johnson¹
5. David E. Finley¹
6. James E. Ellerbe¹
7. Asbury F. Lever¹

3. Wyatt Aiken²

1. George S. Legare³
2. J. O. Patterson³

SOUTH DAKOTA

At large—Charles H. Burke⁴

At large—Eben W. Martin¹

TENNESSEE

2. Richard W. Austin⁴
3. John A. Moon¹
4. Cordeil Hull¹
6. Joseph W. Byrns⁴
7. Lemuel P. Padgett¹

5. W. C. Houston²
9. F. J. Garrett²
10. G. W. Gordan²

1. W. P. Brownlow¹
8. Thetus W. Sims²

TEXAS

1. Morris Sheppard²
2. Martin Dies⁴
4. C. B. Randell⁶
5. Jack Beall²
6. Rufus Hardy²
8. John M. Moore²
9. George F. Burgess²
10. A. S. Burleson³
11. Robert L. Henry²
15. J. N. Garner²

7. A. W. Gregg²
12. O. W. Gillespie^{1*}
13. John H. Stephens¹
14. James L. Slayden²
16. W. R. Smith²

Gordon Russell², Third district, does not appear in the Record.

*Answered "Present"

UTAH

At large—Joseph Howell²

VERMONT

1. David G. Foster¹
2. Frank Plumley⁴

VIRGINIA

2. H. L. Maynard¹
3. John Lamb¹
4. Robert Turnbull⁶
5. E. W. Saunders¹
9. Charles B. Slemph¹

7. James Hay²
8. C. C. Carlin³
10. Henry D. Flood¹

1. William A. Jones¹
6. Carter Glass¹

WASHINGTON

3. Miles Poindexter⁵

1. W. E. Humphrey²

2. W. W. McCredie⁵

WEST VIRGINIA

1. W. P. Hubbard¹
2. George C. Sturgiss¹
3. Joseph H. Gaines³

4. H. C. Woodyard³
5. James A. Hughes³

WISCONSIN

1. Henry A. Cooper¹
2. John M. Nelson¹
4. William J. Cary³
7. John J. Esch¹
8. James H. Davidson¹
9. G. Küstermann²
11. Irvine L. Lenroot⁵

5. W. H. Stafford²

3. Arthur W. Kopp⁵
6. C. H. Weisse³
10. Elmer A. Morse¹

WYOMING

At large—F. W. Mondell³

SUMMARY BY STATES AND SECTIONS

	<i>Sixtieth Congress</i>			<i>Sixty-first Congress</i>		
	<i>Yeas</i>	<i>Nays</i>	<i>Not voting</i>	<i>Yeas</i>	<i>Nays</i>	<i>Not voting</i>
NEW ENGLAND						
Maine	4	..	..	2	..	2
New Hampshire.....	2	..	..	2	..	..
Vermont	2	..	..	2	..	..
Massachusetts.....	13	..	1	12	..	2
Rhode Island.....	1	..	1	1	..	1
Connecticut	4	..	1	3	..	2
	—	—	—	—	—	—
	26	..	3	22	..	7
MIDDLE						
New York.....	17	11	9	12	10	15
New Jersey.....	3	4	3	5	1	4
Pennsylvania	10	12	10	9	6	17
Delaware.....	1	..	..	1	..	..
	—	—	—	—	—	—
	31	27	22	27	17	36
CENTRAL						
Michigan	8	3	1	6	1	5
Ohio	10	5	6	3	10	8
Indiana	3	9	1	..	9	4
Illinois	5	13	6	13	4	8
Wisconsin	5	4	2	7	1	3
Minnesota	2	7	..	1	6	2
Iowa	2	7	2	..	7	4
Missouri	3	9	4	4	9	3
North Dakota.....	..	1	4	4	9	2
South Dakota.....	2	1	1	..	..	1
Nebraska	4	1	1	4	..	2
Kansas	2	4	2	3	3	2
Oklahoma .....	..	4	1	1	..	4
	—	—	—	—	—	—
	46	67	27	43	50	48
ROCKY MOUNTAIN AND COAST						
Montana .....	..	..	1	..	..	1
Wyoming .....	..	1	..	..	..	1
Colorado .....	..	3	..	..	2	1
Nevada .....	..	..	1	..	1	..
Idaho .....	..	1	..	..	1	..
Utah .....	..	1	..	..	1	..
Washington .....	..	3	..	1	1	1
Oregon .....	..	2	..	..	2	..
California	1	6	1	2	2	4
	—	—	—	—	—	—
	1	17	3	3	10	8

SOUTHERN

Maryland.....	3	..	3	2	..	4
Virginia	7	1	2	5	3	2
West Virginia.....	2	..	3	3	..	2
Kentucky	5	3	3	..	5	6
Tennessee	6	4	..	5	3	2
North Carolina.....	7	2	1	6	..	4
South Carolina.....	4	1	2	4	1	2
Georgia	2	6	3	1	6	4
Florida .....	..	..	3	..	1	2
Alabama	6	2	1	4	..	5
Mississippi	2	3	3	..	2	6
Louisiana	4	1	1	4	..	3
Arkansas	2	2	3	1	3	3
Texas	3	11	2	..	10	5
	53	36	30	35	34	50

HOW THE HOUSE DIVIDED POLITICALLY

	<i>Yea</i>		<i>Nay</i>		<i>Not voting</i>	
	R.	D.	R.	D.	R.	D.
Alabama .....	..	4	..	..	..	5
Arkansas .....	..	1	..	3	..	3
California	2	..	2	..	4	..
Colorado .....	..	..	..	2	..	1
Connecticut	3	..	..	..	..	2
Delaware	1	..	..	..	..	..
Florida .....	..	..	..	1	..	2
Georgia .....	..	1	..	6	..	4
Idaho .....	..	..	1	..	..	..
Illinois	9	4	3	1	7	1
Indiana .....	..	..	1	8	1	3
Iowa .....	..	..	7	..	3	1
Kansas	3	..	3	..	2	..
Kentucky .....	..	..	..	5	3	3
Louisiana .....	..	4	..	..	..	3
Maine	2	..	..	..	2	..
Maryland .....	..	2	..	..	3	1
Massachusetts	9	3	..	..	1	1
Michigan	6	..	1	..	5	..
Minnesota	1	..	5	1	2	..
Mississippi .....	..	..	..	2	..	6
Missouri	2	2	2	7	2	1
Montana .....	..	..	..	..	1	..
Nebraska	2	2	..	..	1	1
Nevada .....	..	..	..	1	..	..
New Hampshire.....	2	..	..	..	..	..
New Jersey.....	3	2	1	..	3	1
New York.....	9	3	10	..	7	8
North Carolina.....	2	4	..	..	1	3
North Dakota.....	..	..	..	..	2	..
Ohio	2	1	8	2	3	5
Oklahoma	1	..	..	..	2	2
Oregon .....	..	..	2	..	..	..
Pennsylvania	6	3	6	..	15	2
Rhode Island.....	1	..	..	..	..	2
South Carolina.....	..	4	..	1	..	2
South Dakota.....	1	..	..	..	..	1
Tennessee	1	4	..	3	1	1
Texas .....	..	..	..	10	..	5
Utah .....	..	..	1	..	..	..
Vermont	2	..	..	..	..	..
Virginia	1	4	..	3	..	2

Washington	1	..	1	..	1	..
West Virginia.....	3	..	..	..	2	..
Wisconsin	7	..	1	..	2	1
Wyoming .....	..	..	..	..	..	1
	<hr/> 82	<hr/> 48	<hr/> 55	<hr/> 56	<hr/> 76	<hr/> 74

WHAT TWO VOTES SHOW

In the two votes taken on the Weeks bill, that in the Sixtieth Congress and that in the Sixty-first, all but fifty-two members of the present House have gone on record. Owing to the conditions under which the vote was taken in the present House, many of the members having left Washington, the vote was lighter than that in the Sixtieth Congress. A comparison of the individual records, as shown in the preceding statement, show that there were twelve changes from "No" to "Yes"—three in Illinois, two in Pennsylvania, and one each in California, Kansas, Michigan, New Jersey, New York, Ohio, and Wisconsin. There were five changes from "Yes" to "No"—three in Ohio, one in Illinois, and one in Virginia. This takes account only of personal votes, and does not include the votes of new members whose predecessors may have voted in the same or in a different way. Considering this individual record, it is interesting to tabulate the standing of the present House as shown by the two record votes. This is given in the following table. In making up these figures, members who voted differently in the two Congresses are placed according to their last vote. Those who did not vote this year, but who did vote in the Sixtieth Congress, are placed according to their vote at that time. This gives a fair estimate, and it is evident that very few changes would have occurred.

	<i>Yea</i>	<i>Nay</i>	<i>Non-committal</i>
Alabama.....	6	2	1
Arkansas.....	1	4	2
California.....	2	5	1
Colorado.....	..	2	1
Connecticut.....	5	..	..
Delaware.....	1	..	..
Florida.....	..	1	2
Georgia.....	2	8	1
Idaho.....	..	1	..
Illinois.....	14	9	2
Indiana.....	..	11	2
Iowa.....	1	8	2
Kansas.....	4	4	..
Kentucky.....	4	5	2
Louisiana.....	4	1	2
Maine.....	4	..	..
Maryland.....	4	..	2
Massachusetts.....	14	..	..
Michigan.....	9	2	1
Minnesota.....	1	8	..
Mississippi.....	2	4	2
Missouri.....	5	10	1
Montana.....	..	..	1
Nebraska.....	5	1	..
Nevada.....	..	1	..
New Hampshire...	2	..	..
New Jersey.....	5	3	2
New York.....	19	14	4
North Carolina...	8	1	..
North Dakota.....	..	1	1
Ohio.....	7	11	3
Oklahoma.....	1	3	1
Oregon.....	..	2	..
Pennsylvania.....	12	11	8
Rhode Island.....	2	..	..
South Carolina...	4	1	2
South Dakota....	2	..	..
Tennessee.....	6	4	..
Texas.....	2	14	..
Utah.....	..	1	..
Vermont.....	2	..	..
Virginia.....	7	3	..
Washington.....	1	1	1
West Virginia....	3	..	2
Wisconsin.....	8	1	2
Wyoming.....	..	1	..
	<hr/> 179	<hr/> 159	<hr/> 51

IN THE SENATE

While this successful fight was being waged in the House, the bill had come up in the Senate, and very different and very unexpected conditions developed there. On the 22d of June, Mr. Brandegee moved the consideration of the bill, which was popularly known in that

body as the Gallinger bill. On a roll call this was voted forty-eight to sixteen, with twenty-eight senators not voting. This made the bill the unfinished business of the Senate, and Senator Brandegee at that time contented himself with putting in the bill, together

with the report of the committee on forest reservations and the protection of game, and the report by the Secretary of Agriculture of 1907 on the examination of the Appalachian and White Mountain watersheds. This made these documents a part of the record and put them in printed form before the senators on the following day.

At two o'clock on Thursday, the 23d, the unfinished business was taken up and the bill read. Senator Burton of Ohio at once entered upon obstructive tactics. Senator Brandegee presented the bill with a speech in its favor, but was subjected to frequent interruptions by Senator Burton, assisted by Senator Newlands. It became evident very early in the discussion that a few senators were playing for time.

Following Senator Brandegee's speech, Senator Newlands secured the floor and proposed an amendment to strike out all after the enacting clause and to substitute a bill of his own providing for a conservation commission. In support of this, Mr. Newlands made a long argument, some parts of which were more or less pertinent to the question which he was supposed to discuss. The discussion of the bill was also interrupted by conference reports at intervals and some of these occupied considerable time. Senator Stone of Missouri offered an amendment providing for the survey of certain swamp lands in the states of Missouri, Arkansas, and Louisiana, and his argument on this amendment was made somewhat at length.

Finally, after a long-drawn-out session, a quorum failing, the Senate adjourned at a little after seven o'clock. On the following day, when the hour for unfinished business arrived, the consideration of the bill was resumed and a desultory discussion followed in the intervals of other business. On Saturday, when it became evident that the filibustering senators would hold their ground, negotiations were entered into for an agreement to secure a vote at the next session. The House bill, having passed that body and been sent to the Senate, was substituted for the Senate

bill as unfinished business. Having secured this result, Senator Brandegee made the following statement:

This being the unfinished business, I, a few minutes ago, made a request that the Senate should vote upon it before adjournment. There was objection. The senator from Ohio stated that there were other senators who desired to be heard, and he had no idea that it could be finally acted upon at the present session. It has been perfectly evident to everybody from what has been going on here ever since we have had this bill under discussion that it could not be passed at this session. I am satisfied, and I think every senator on this floor is satisfied, that it is hopeless, in view of the present situation, to press the measure further upon the attention of the Senate at this time.

In view of that fact, and not desiring to block other business on this, the last day of the session, I ask unanimous consent that upon February 15, 1911, the Senate shall vote upon all amendments pending or to be offered to the bill (H. R. 11798) entitled "A bill to enable any state to cooperate with any other state or states, or with the United States, for the protection of the watersheds of navigable streams, and to appoint a commission for the acquisition of lands for the purpose of conserving the navigability of navigable rivers," and upon the bill itself, before adjournment on that day.

During the discussion on the agreement asked for by Senator Brandegee, Senator Newlands frankly stated that he desired to have matters so arranged that every man who was a friend of the Appalachian proposition would be compelled to vote for the general waterways scheme, which he is interested in having embodied in legislation. Senators Brandegee and Gallinger both stated that they were in favor of enlarging the commission provided for by the bill and extending its functions to include at least some of the things desired by Senator Newlands. Finally, after a long discussion, the request of Senator Brandegee was agreed to and the matter was disposed of for this session by the Senate with that understanding—that the bill with all amendments that may be proposed in the meantime, shall be voted on before adjournment on the 15th of February next. This introduces an uncertain element in the form of possible amend-

ments in regard to which the friends of the bill must be on their guard.

Therefore, the only vote taken in the Senate was that by which the bill was made unfinished business. The division on this was practically what it would have been if the vote had been upon the bill itself. The roll call on this was as follows:

YEAS—48

Bacon	Gallinger
Beveridge	Gamble
Bradley	Guggenheim
Brandegee	Hale
Briggs	Keane
Bulkeley	LaFollette
Burkett	Lodge
Burnham	McEnery
Burrows	Nelson
Carter	Oliver
Chamberlain	Overman
Clapp	Page
Clark, Wyo.	Perkins
Crane	Piles
Cullom	Purcell
Cummins	Scott
Curtis	Simmons
Depew	Smith, S. C.
Dixon	Smoot
du Pont	Stephenson
Elkins	Sutherland
Fletcher	Taylor
Flint	Warner
Frazier	Wetmore

NAYS—16

Bailey	Gore
Bankhead	Heyburn
Bourne	Hughes
Bristow	Jones
Brown	Newlands
Burton	Paynter
Crawford	Percy
Dick	Shively

NOT VOTING—28

Aldrich	Martin
Borah	Money
Clarke, Ark.	Nixon
Clay	Owen
Culberson	Penrose
Daniel	Rayner
Davis	Richardson
Dillingham	Root
Dolliver	Smith, Md.
Foster	Smith, Mich.
Frye	Stone
Johnston	Taliaferro
Lorimer	Tillman
McCumber	Warren

An examination of the detailed vote by states, given below, shows that thirty-nine Republicans voted yes, eight voted no, and thirteen were not recorded. Of the Democrats, nine voted yes, eight voted no, and fifteen were not recorded. An analysis of the vote by sections and states is also given. From this, however, in the case of the Senate, little can be inferred. The question seems to have been largely one of personal judgment, or of personal relations with other senators.

THE SENATE VOTE IN DETAIL

ALABAMA

John H. Bankhead, no.
J. F. Johnston, did not vote.

ARKANSAS

James P. Clarke, did not vote.
Jeff Davis, did not vote.

CALIFORNIA

George C. Perkins, yes.
Frank P. Flint, yes.

COLORADO

Simon Guggenheim, yes.
Charles J. Hughes, Jr., no.

CONNECTICUT

Morgan G. Bulkeley, yes.
Frank B. Brandegee, yes.

DELAWARE

Henry A. du Pont, yes.
Harry A. Richardson, did not vote.

FLORIDA

J. P. Taliaferro, did not vote.
Duncan U. Fletcher, yes.

GEORGIA

Augustus O. Bacon, yes.
Alexander S. Clay, did not vote.

IDAHO

W. B. Heyburn, no.
William E. Borah, did not vote.

ILLINOIS

Shelby M. Cullom, yes.
William Lorimer, did not vote.

INDIANA

Albert J. Beveridge, yes.
Benjamin F. Shively, no.

IOWA

J. P. Dolliver, did not vote.
Albert B. Cummins, yes.

KANSAS

Charles Curtis, yes.
Joseph L. Bristow, no.

KENTUCKY

Thomas H. Paynter, no.
William O. Bradley, yes.

LOUISIANA

Samuel D. McEnery, yes.
Murphy J. Foster, did not vote.

MAINE

Eugene Hale, yes.
William P. Frye, did not vote.

MARYLAND

Isidor Rayner, did not vote.
John W. Smith, did not vote.

MASSACHUSETTS

Henry Cabot Lodge, yes.
W. Murray Crane, yes.

MICHIGAN

Julius C. Burrows, yes.
William A. Smith, did not vote.

MINNESOTA

Knute Nelson, yes.
Moses E. Clapp, yes.

MISSISSIPPI

H. de S. Money, did not vote.
Le Roy Percy, no.

MISSOURI

William J. Stone, did not vote.
William Warner, yes.

MONTANA

Thomas H. Carter, yes.
Joseph M. Dixon, yes.

NEBRASKA

Elmer J. Burkett, yes.
Norris Brown, no.

NEVADA

Francis G. Newlands, no.
George S. Nixon, did not vote.

NEW HAMPSHIRE

Jacob H. Gallinger, yes.
Henry E. Burnham, yes.

NEW JERSEY

John Kean, yes.
Frank O. Briggs, yes.

NEW YORK

Chauncey M. Depew, yes.
Elihu Root, did not vote.

NORTH CAROLINA

F. M. Simmons, yes.
Lee S. Overman, yes.

NORTH DAKOTA

P. J. McCumber, did not vote.
W. E. Purcell, yes.

OHIO

Charles Dick, no.
Theodore E. Burton, no.

OKLAHOMA

Thomas P. Gore, no.
Robert L. Owen, did not vote.

OREGON

Jonathan Bourne, Jr., no.
George E. Chamberlain, yes.

PENNSYLVANIA

Boies Penrose, did not vote.
George T. Oliver, yes.

RHODE ISLAND

Nelson W. Aldrich, did not vote.
George P. Wetmore, yes.

SOUTH CAROLINA

B. R. Tillman, did not vote.
E. D. Smith, yes.

SOUTH DAKOTA

Robert J. Gamble, yes.
C. I. Crawford, no.

TENNESSEE

James B. Frazier, yes.
Robert L. Taylor, yes.

TEXAS

C. A. Culberson, did not vote.
J. W. Bailey, no.

UTAH

Reed Smoot, yes.
George Sutherland, yes.

VERMONT

W. P. Dillingham, did not vote.
Carroll S. Page, yes.

				CENTRAL—Continued			
VIRGINIA				Yea	Nay	voting	
<i>John W. Daniel</i> did not vote.				Illinois.....	1	..	1
<i>Thomas S. Martin</i> , did not vote.				Wisconsin.....	2	..	..
WASHINGTON				Minnesota.....	2	..	..
Samuel H. Piles, yes.				Iowa.....	1	..	1
Wesley L. Jones, no.				Missouri.....	1	..	1
WEST VIRGINIA				North Dakota....	1	..	1
Stephen B. Elkins, yes.				South Dakota....	1	1	..
Nathan B. Scott, yes.				Nebraska.....	1	1	..
WISCONSIN				Kansas.....	1	1	..
R. M. LaFollette, yes.				Oklahoma.....	..	1	1
Isaac Stephenson, yes.					13	7	6
WYOMING				ROCKY MOUNTAIN			
Francis E. Warren, did not vote.				AND COAST			
C. D. Clark, yes.				Montana.....	2	..	..
THE VOTE BY STATES AND SECTIONS				Wyoming.....	1	..	1
				Colorado.....	1	1	..
				Nevada.....	..	1	1
				Idaho.....	..	1	1
				Utah.....	2	..	..
				Washington.....	1	1	..
				Oregon.....	1	1	..
				California.....	2	..	..
					10	5	3
				SOUTHERN			
				Maryland.....	..	..	2
				Virginia.....	..	..	2
				West Virginia....	2	..	..
				Kentucky.....	1	1	..
				Tennessee.....	2	..	..
				North Carolina....	2	..	..
				South Carolina....	1	..	1
				Georgia.....	1	..	1
				Florida.....	1	..	1
				Alabama.....	..	1	1
				Mississippi.....	..	1	1
				Louisiana.....	1	..	1
				Arkansas.....	..	..	2
				Texas.....	..	1	1
					11	4	13



AGENCIES FOR THE RESTORATION AND CONSERVATION OF FORESTS

By S. B. ELLIOTT

Member of Pennsylvania State Forest Reservation Commission

EVERY student of the history of nations is aware that the destruction of the forests over any great expanse of a populated country has led to soil conditions there which now show little better than absolute barrenness; and he is also well aware that the intellectual condition of the inhabitants of such regions verges on barbarism. He is likewise cognizant of the converse fact that the countries which have conserved their forests in usefulness have also maintained the fertility of the soil, are enjoying abundant prosperity, and stand high in intellectual, moral, and social well-being.

It certainly is not necessary to show at length that this assertion is true, for even the casual observer must see that it is; and whoever seriously doubts it needs only to glance at the conditions of several of the Old World countries to be convinced of its accuracy. Assuming it to be an established fact that the destruction of the forests of a country results in barrenness of soil and a low state of civilization, and that the useful conservation of the forests promotes prosperity and high intellectuality, it would be illogical and unreasonable to conclude that an intelligent people, with history before them, will permit such destruction and thereby suffer the inevitable results that it entails. And, further than this, it is safe to conclude that such people will put forth every effort to restore their forests where destroyed and to conserve

and maintain them in perpetual usefulness after restoration, for any other course is inconceivable. Accepting this as a settled endeavor of the people of this country, it is left for our consideration, on this occasion, to determine through what agencies the restoration and conservation of our forests can be secured, and by whom and through what instrumentalities, both near and remote, such desirable ends can be brought about.

Not until recent times has the general public given any thought to our forest resources. It has been believed that they were ample to supply all our needs, and that we had only to exploit them, and could do so to any extent; but the irresistible "logic of events," manifesting itself through the growing scarcity of the best grades of lumber, and the rapidly increasing price of all kinds, has forced a consideration of what must be done to avert a timber famine in the near future—a famine which it is but truth to say will surely be felt for a long time, and its severity will be measured by such action as shall be taken to alleviate it.

Realizing that something must be done, it was but natural that the agencies through which it could be brought about should be considered; and the trend of thought, or, to use a somewhat hackneyed phrase, the "consensus of opinion," has designated the national and state governments as the proper parties to begin and carry on the work. Now, while the question of ownership and exploitation of our natural resources is involved in the restoration and conservation of our forests by

NOTE.—This paper was given as a lecture in the valuable course of public lectures on forestry under the auspices of Lehigh University.

government, that debatable subject must be ignored here for the reason that conditions and not theory will determine in the matter of the forests. But this much can and should be said: If conditions were alike, there is no more reason why either national or state governments should grow, maintain, and dispose of forests and forest products than there is that they should grow, harvest, and sell wheat or other products of the soil known as farm crops, a work not recognized as a governmental function. But conditions are unlike; the element of time of maturity enters largely into the case. Farm crops, in the main, mature in one year, while it takes well on toward a century for forests to grow fit to harvest. In one case, the time is well within the limits of the average individual's lifetime; yet that feature does not prevail when he grows trees, but it does when the government engages in it. We do not contemplate the government's death; we assume that it will live for all time, and that it is as much its duty to provide for the future as for the present. For that reason, growing and disposing of the forests of the country should not be classed with the control of other natural resources. Nor is this the only difference. It is no wild shriek when we declare that the forest is the only one of our natural resources that can be perpetuated. It is a living, burning fact, the existence of which all must admit; and it carries with it the obviously greater need to put forth efforts to maintain in perpetuity the only one possible, for in our frantic efforts to exploit our natural resources we are hastening the period of their exhaustion, and when that time is reached development and destruction will have become practically synonymous terms.

In a recent speech at Spokane, President Taft stated that: "The United States government timber land is only about one-fourth the timber land owned by private individuals." He referred to the productive forests and did not include cut-over lands, of which the United States government owns but

little. This gives us a basis upon which to approximately determine what our national government can now do toward furnishing a supply of forest products. If the forests of the country are ample in extent, then the government's supply of one-fifth will suffice; if not ample, then that supply may fall far short of the needed amount, a supply which will continue to grow less through exhaustion until new forests can be grown. The question then arises, are they ample? Recent statistics show that we are consuming our forest products more than three times faster than they grow. If this be so, and it undoubtedly is, the forests owned by the United States government will utterly fail in supplying the demands of the country, and that, too, without considering any increase of population or new uses for wood, both of which will inevitably occur; and, furthermore, it must be remembered that some of the timber lands now belonging to the government must be given up for settlement, for forestry must not claim land suitable for agriculture. Thus, the restoration and conservation of our productive forests by the United States government will be greatly restricted unless it shall plant additional ones or purchase them, as advocated in the case of the Southern Appalachian and the White Mountain reservations—a proposition which the judiciary committee of the House of Representatives in Congress has decided would be unconstitutional, unless for the sole and declared purpose of providing for the protection and preservation of the navigable rivers receiving their waters from such areas; and this would probably give no power to harvest the timber; and without that power such areas would be of little value in supplying forest products. It will appear from this that a constitutional amendment will be necessary to enable the government to increase its timber producing forests, unless by planting. That such power should be given, there is no question; but whether it will be, is a matter of uncertainty.

Whether the United States is administering its forests in the best manner possible to produce the fullest yield, is not a point that need now be considered. If it is not, that certainly can be remedied; but those who anticipate larger returns from government lands must bear in mind that most of the timber lands owned by it are in mountainous regions, where intensive forestry will be found extremely difficult, if not impossible, and that much of the present stand must be maintained intact in order to preserve the watersheds of the rivers that are to be used for irrigation. Of course, the government may possibly increase its forest area by planting trees where none now are, and it is gratifying to know that vigorous efforts are being made in that direction. But it must be understood that the forest trees of the Great West are not suited for all locations. In fact, the most important ones have been found to flourish only in their natural habitat.

Notwithstanding that government ownership of our timber lands seems inconsiderable, it may appear in a different light when we compare it with that of European nations where the crown and state of the German Empire own but thirty-three per cent of the productive forests within her borders, the government of France thirteen, and the crown and state of Austria seven; and that, too, where forestry has been systematically carried on for more than 150 years. But for all this, it must not be inferred that any thought is entertained that the United States government should not do all reasonable things within its power to maintain our forests in perpetual usefulness, for it certainly should; but that is not the question under consideration. We are discussing only its ability to do.

When we consider the part that our state governments can and should take in caring for the forests we find a somewhat different condition. Few states now hold land by sovereign right, as does the United States government. Nearly all the older states disposed of their original possessions long ago. If there exist, within any State, forests

which do not belong to it, and it shall seek to possess them, the state must purchase them of the owners by agreement, or exercise its right of eminent domain and pay such sums therefor as may be adjudged under legal process. In either case, the cost would, no doubt, be prohibitive. There may be those who would favor such proceedings at any cost, but they should remember that no matter who owns them, such forests must be harvested in the near future to supply the demand for forest products, nor should the power of eminent domain be tyrannically invoked.

So it will be seen that there is little probability that many states will secure productive forests to any appreciable extent. However, the state of New York has purchased quite a large area of such forests, but not one tree therein can be cut until the state's constitution shall be amended; while Pennsylvania, New Jersey, and Minnesota, and possibly one or two other states, have secured some lands upon which there is a young growth coming on, and from which a small amount of timber can soon be harvested; but, in the main, we must wait until forests grow. A change of ownership will help little; the need of the hour is more forests. Therefore, about all that can be consistently and profitably be done by the states in their governmental capacity is to purchase land now practically devoid of forests and grow new ones thereon, and when grown, to so conserve them that they will yield a continuous supply; and this also brings up the question of ownership and exploitation of natural resources by state governments, quite the same as in the case of forests owned by the national government. That the states should own and manage forests to a limited extent will, doubtless, be conceded by most economists, and possibly some would set no limit; but that question need not here be discussed any more than before, for conditions govern here as well, and put a limit beyond which it appears impracticable if not impossible to go; and we must accept such conditions and do the best we can. There are some states in which there is com-

paratively little land, except the farmer's woodlot, which should be given to forestry, because quite all of it is well adapted for agriculture, and should be devoted to that purpose. Then, there are some states whose financial resources are so limited that no considerable planting of forests and maintaining them until maturity need be expected of them. It is unnecessary to name these, but such is the fact, and the truth is patent that no great amount of forest restoration and ownership by the state governments can be depended upon. It is true, however, that there are some states in which this can be profitably undertaken, but there is a limit even there.

Take, for instance, our own state of Pennsylvania, which is among those best conditioned—if not the very best—for the restoration of her forests and conserving them in useful perpetuity when restored. Her virgin forests are nearly all gone, and will be practically so within the next decade; but were there a million acres, she could not purchase even one, for the law limits the price to be paid by the state to \$5 per acre, and the value of such forests is now not less than \$50, and much of it above \$100. Whatever is done must be done along the line of restoration on cut-over and burned-over lands. There are about 8,500,000 acres—practically thirty per cent of the total area—of non-agricultural land within her borders, and, mark you, it is not proposed to devote land to forestry that it suitable for agriculture. While much of this is in large bodies, and some owners have large holdings, still a great proportion of it is in possession of small land owners. There is scarcely a farm that does not contain some of it, and but few of such small tracts can be secured by the state, except by the exercise of its right of eminent domain, even were they desirable, and they certainly would not be if in small and detached pieces. The state already owns almost 1,000,000 acres of cut-over and much of it burned-over land, and it is constantly purchasing more. But there is a limit to what it can as well as what

it should do, for fully three-fourths of what it now owns, or will be likely to own, must be reforested by planting trees, as has been found necessary in European experience, in order to restore and maintain forests in perpetuity. It is possible that the state can secure, say, 2,000,000 acres, perhaps more, but she should possess not less than 6,000,000 to meet the demands of her own citizens, and it is not probable that so much can be obtained; and that would be only about forty-one per cent of her total area, while Germany's forests cover twenty-six per cent of the empire's domain, and she imports one-third of the forest products consumed by her people, and her forests are far more productive than ours.

Thus it will be seen that the power of the state governments to restore and conserve the forests within their domain is, as in the case of the general government, quite limited; but, were they not limited by prevailing conditions which cannot be overcome, would it be best for a state to own all or any great portion of the forests within her borders? If our government were of a form in which there would be little or no change of policy consequent upon the triumph of one or the other of political parties, it would present a different case than now confronts us, when a change of party control may come every four years. As long as politics can be kept out of forestry management, all things may go along well; but who can depend upon or guess what may happen in the realm of politics when the forests become valuable? To imagine they would not then become the prey of the grafter and political schemer would be no less absurd and improbable than to believe the millennium would then come. That the state as well as the national government should own and control enough forests to at least prevent a monopoly through a combination of private owners, must not be denied; but that either or both should do all this is impossible, and would be impracticable were it possible, yet the claim advanced by some that private interests should alone develop

natural resources is as objectionable as that the state should do all. Private ownership of a public necessity should be placed under such governmental control as to protect public interests, and it may be best, ere long, for the states to exert their inherent police power to control, to a limited extent, the forests belonging to corporations, municipalities, and private individuals. This has been found necessary in Europe in order to prevent damage to public interests. The state of Maine has already adopted measures looking to such control, and others will be likely to follow. At first glance, this seems a serious encroachment upon private rights, but, as in all like cases, the rights of the public are paramount.

As has already been stated, public opinion has heretofore been almost entirely in favor of governmental action alone, and other agencies have been given little consideration; but if what has been thus far insisted upon are the actual conditions prevailing, then others, though at present thought of little moment, are the important ones; for if the government cannot do the work, other agencies must, or it will not be done. Who, then, must conserve the forests on four-fifths of the timber land of the United States which the President tells us is in the hands of private individuals? and who must plant and restore the forests on the cut-over and burned-over lands unfitted for agriculture? It would seem that the answer is not hard to find, and yet few have given it serious thought.

As has been indicated, the duration of the life of the party undertaking the restoration and conservation of our forests play an important part in the probability of their accomplishment. Those having a legal existence—created by law and “take no note of time”—do not labor under the disadvantages incidental to human life. Such are known as corporations, whose lives are seldom limited by the power which creates them. Among those whose interests would be greatly enhanced by the restoration and conservation of our forests are the railroads, who need tim-

ber for ties and many other purposes; the mining corporations, who must have timber for props and a multitude of other uses; the paper manufacturers and lumbermen, whose very existence depends upon a supply of wood, and others, like the tanneries, which largely depend upon forest products to carry on their work. Not only is there an economic reason why all these should engage in the work of restoration and conservation, but there is another feature that is important and must not be forgotten. All these are consuming the forests for what may be termed self-aggrandizement or gain, and the public at large receives only the benefit of being served at a price, and a good round one at that. All such bodies should recognize the duty they owe to the public to restore and keep good the forests which they are exploiting for themselves only, and if they will not recognize that duty, and act upon it, they should be compelled by law to do so. In some European countries, no one is permitted to remove trees from his own land without planting an equal or greater number, so that destruction of the forests will not ensue. If the corporations do not possess forests of their own—but many of them do—laws should be enacted whereby those who cut down forests for them shall restore them by planting. Doubtless, this scheme to compel the replacing of what is cut off will be looked upon as revolutionary and subversive of natural rights, and we may not be prepared for it just now; but be that as it may, it will come to that in due time or the index hand on the dial of progress of this nation will go backward, never to again advance until that or something akin to it shall prevail.

But there is another class of corporations which stand in a different attitude toward the public. In such the public at large is interested in everything connected with them, and is in full control of them—in fact, they belong to the public. These are the municipal corporations—the townships, boroughs, cities, and counties. That they can and should grow and maintain

forests is no new thing in forestry in Europe. It has long been carried on there by cities and communal organizations, and to their financial profit, too; and I beg indulgence to give a few statistics which have been furnished me by a friend who secured them recently from original sources in Germany:

The Grand Duchy of Baden contains 3,726,732 acres of forest, of which 577,465—about sixteen per cent—belongs to communities and corporations. These are allowed to cut annually 261,724,000 board feet, with a value of about \$3,600,000, free from the expense of cutting. This shows a yield of 700 board feet per acre; our forests do not exceed 125 feet.

The city of Baden owns 10,576 acres, which yield a net annual income of \$6.25 per acre.

The city of Friburg has 8,085 acres, and receives \$5.79 net per acre annually.

The city of Heidelberg possesses 6,860 acres, and it brings in annually \$1.91 per acre. This city is acquiring forest land, and is in the period of expense; besides, the city looks more to esthetics than for income from forests.

The city of Villingen has 8,822 acres, and receives annually a net return of \$4.84 per acre.

The village of Braunlingen has 1,600 inhabitants and owns 3,504 acres. The yearly annual allowance is 2,500,000 board feet—700 feet per acre—of which an equivalent of 3,500 board feet is given each citizen, and 100,000 board feet is given to schools, churches, town hall, etc. The timber sold brings in an annual income of \$21,600, so that the community is not only free from all communal taxes, but is able to establish modern works, as electric plants, water-works, schoolhouses, churches, etc.

The village of Volterdingen has 784 inhabitants and owns 1,124 acres. The annual allowance is 675,000 board feet—600 feet per acre—and the village realizes more than enough to be free from all communal taxes, and to be able to keep the village on a good financial footing.

The village of Aufen has 220 inhabitants and 163 acres of forest. It gives each citizen eight cubic meters of wood (value, \$12), and sells \$1,440 worth annually. The sanctioned annual yield of this forest is 137,500 board feet—about 800 feet per acre.

We may not yet have reached the point when townships and counties must undertake restoration and care of forests, but the period is fast approaching when some of the counties in this state whose areas are composed largely of cut-over and burned-over forest lands, will be compelled to take such lands for unpaid taxes, and will then receive no income from them whatever, and unless relief shall come in some way not now seen they will, ere long, face bankruptcy and possible extinction as county organizations. But we have some boroughs and cities which may now profitably engage in it in an official capacity—in part as a business transaction, but more for securing and controlling an ample and uncontaminated water supply. This has been made possible in our state by an act passed at the last session of the legislature, largely through the instrumentality of the American Civic Association. By its provisions, municipalities can engage in forestry; but for some unaccountable reason, the act mentioned was robbed of an important feature—the right of eminent domain. However, that can be restored, and undoubtedly will be, by a more enlightened legislature.

Now, to illustrate this view of the possibilities of municipal undertaking in forestry, permit me to cite the case of the great city of Philadelphia. Supposing it had purchased a few years ago from 100,000 to 200,000 acres of land in the counties of Monroe and Pike, in this state, which could have been secured at an expense of not exceeding \$2.50 per acre, and probably less. Upon most of this there was a growth of young timber, which, by proper treatment, and adding thereto by planting, could have been made productive enough to soon aid in defraying expenses for care, and by the lapse of forty years, or thereabouts, come into

full production and be as remunerative as the German forests noted. By doing this, it would have come into possession of a large number of lakes with which that elevated region abounds. These could have been converted into storage reservoirs for the numerous clear, pure streams that flow into them, by constructing dams at their outlets. Then, if at the time of purchase, it had conducted that pure water supply by gravity to the distributing system in its borders—the elevation is ample—it would to-day be far better off financially, and thousands of lives would have been saved. The city's dependence now is upon a filtering system both costly in maintenance and uncertain in results, and, withal, insufficient. The returns from the forests would more than defray the expense of maintenance to the city limits.

Such an undertaking would have been no more gigantic and expensive for Philadelphia than is the one New York city is now carrying on to secure a new source of water supply from the Catskill Mountains, where no revenue can come to the city from the forests; nor as much so as that of Los Angeles, where water is being obtained in the Rocky Mountains 300 miles away. Besides, Philadelphia could have furnished water to towns and cities along the route. When our people come to understand and appreciate how important forests are in maintaining an equable flow of springs and streams, they will see that municipalities, by an investment in forests on the watersheds of streams which supply them, can secure a pure and continuous supply, and, beyond that, reap a financial profit from the sale of forest products.

Dismissing national and state governmental action, and that of all kinds of corporations, we come, at last, to the land owner, who must do what the others will not, and who must do it in his individual capacity; and here is a problem so complicated and so large that it can be discussed only in a general way at this time. Conditions here are wholly unlike those in most countries. With us, large land holdings by

individuals are frowned upon as inimical to public interests, and entail is not tolerated. Our land owners comprise a vast multitude. They hold in fee, and their domains are mainly small, and nearly all of them should, for their own protection, engage in restoration and conservation of the forests of the country. This is especially true of farmers, who must, of necessity, possess what are known as woodlots, where shall be grown their fuel and such other timber as may be required about the farm. In a short time such work will become imperative, and the farmer should no longer delay entering upon it. Two-thirds of the people in the United States use wood for fuel, and more will as soon as natural gas and coal become less plentiful. Unfortunately, the great importance of this feature is not yet realized, and every effort should be made to awaken the farmer to a conception of it. There is no more reason why the farmer should purchase his fuel than that he should buy his food. He must become an important factor in restoration.

Besides the farmer, there are others who may own large areas, and these can in no other way leave a more beneficent legacy to their children than in a well-forested domain. It will be better than life insurance, and individuals whose large wealth gives them an opportunity to bestow benefits upon posterity can do so in no better form, nor one which will so benefit mankind at large and bless those whose rightful inheritance we are rapidly destroying. From whatever standpoint we may look at it, we will see that individual action must largely control, and that it will not prevail until the people are educated to an appreciation of its importance.

But, after all this insistence that corporations, municipalities, and individuals shall engage in the good work, I am forced to, and sorrowfully do, admit and declare that under the present tax laws of our own and most other states neither corporations, municipalities, nor individuals can now afford to engage in reforestation, for if they do their trees will be practically confiscated

by tax levies. The assessor is bound by law to add the value of the trees to that of the land on which they stand, and that value is, in the main, a prospective and uncertain one. It may never materialize. Disease, winds, fire, or insects may destroy the trees, and at best there can be no return for a long time, while the taxes are continually increasing. Our tax laws were framed when we had a plethora of forests; now we have the reverse, and our laws should be made to conform to present and prospective conditions. The land upon which young trees of valuable species are growing should be taxed as naked land only, and when the crop matures and is harvested, that should be taxed, but not before. Tax the land and product separately. Here is a point for serious consideration, and our lawmakers should take a broad, statesmanlike view of it and remove the incubus that now rests upon the restoration of our forests, for, unless it shall be removed, no improvement of our forest conditions can be expected, except what national and state governments can bring about. President Taft stated in the speech to which I have referred that but three per cent of private timber lands of the United States were administered according to forestry methods. My belief is that not one per cent is, certainly not in Pennsylvania. But that is as much as we should expect under our present system of taxation. Such changes should be made in our tax laws as will encourage all land owners to plant and grow forest trees. We now not only discourage, but practically prohibit them. No half-way work will answer. Hamlet's advice to the players to "reform it altogether" will apply here.

It is confessed that the foregoing exhibit of our condition is neither assuring nor cheerful; but, on the other hand, it is somewhat discouraging. But it must not be forgotten that the whole subject is a new one to our people. Believing our forests inexhaustible, we have not only been diligent in exploiting them, but actually wasteful; and all this must and will cease. It has been this almost universal belief in a perma-

nent supply that has brought about our deplorable condition. But there is good ground for hope. The same conditions prevailed in Germany, France, and Switzerland 200 years ago, and they have succeeded in establishing remunerative forests, and to assert or assume that our people are unable to cope with our present conditions, is to challenge their spirit and intelligence. We can retrieve our misfortune if we but first comprehend the situation.

But how is all this to be accomplished? Briefly stated, it must come through the education of the people; and before closing it will be well to see, for a moment, what instrumentalities are or can be made most potent in that work. Foremost among them all is the public press, next the schools, and after these comes the efforts of associations, societies, and individuals. Too much cannot be said in praise of the willingness and desire of the press to do in the matter of forestry. Rarely does one see anything against the forestry movement in the editorial columns of any influential newspaper of the day. It is only when a partisan spirit is manifested over some proposed legislation which some one deems should be opposed because the opposite party favors it, that anything hostile is to be seen. The public press may be safely set down as friendly to reforestation and conservation. Editors seldom fail to publish any well written communication favoring such measures. It is through the press that the great mass of the people can be reached, and newspapers should be encouraged in their efforts.

Next to the public press, but not so quick to meet conditions and bring about results, are the schools of the land, especially those of the higher grades. Out from their doors go teachers, who, in a broad sense, are public educators and of wide influence, and they mingle with the youth of the land, who must, ere long, take up the work now in its infancy. No more useful effort can be put forth than you are displaying here in Lehigh University. Your efforts are not confined to the classroom, from which they may be

a long time in reaching the public, but they are manifest to all, and you may well rejoice in the beneficence and spirit which give you an opportunity to make your institution one of the agencies through which shall come the restoration and conservation of our forests.

The work that associations and societies may perform is such as the other instrumentalities named are not especially seeking to accomplish, for that of the former is mainly along esthetic lines. The efforts of associations and societies lead to an appreciation of the beauty of the wooded landscape, the opportunities the forests offer for nature study, and their enjoyment as places of amusement, recreation, and health resorts. Though not what commercial forestry mainly seeks, their

work is of great importance. Yet some of these, like that of the Pennsylvania Forestry Association, have taken up the practical as well as the sentimental features of forestry and have accomplished much good.

Lastly, is the individual. Here, as well as elsewhere in all societies, communities, and nations, the height which each attains and keeps is practically that of the average individual composing them. Our forestry advance will be just what the average individual endeavors to make it, and you and I must take upon ourselves the work that is to be done as though the burden were ours alone, to the end that this nation's prosperity shall be continued and maintained and new forests grown for those who are to come after us.

NOTES ON THE IDENTIFICATION OF A TROPICAL WOOD

By C. D. MELL, Assistant Dendrologist, Forest Service

SUCOPIRA is an empirical name of a Brazilian wood submitted for identification, with the object of ascertaining its botanical name and of learning something about the distribution and occurrence of the tree and its commercial importance. The sample was collected by Mr. H. von Bayer, in Para, Brazil, and has no other data except that it was cut from the heartwood of a log about two feet in diameter and that the wood is occasionally imported into Europe for the manufacture of walking canes.

The common or trade name of a wood often aids in determining its botanical name, but entirely different woods

often have the same common name, and very careful study and comparison are therefore necessary before one can be sure that an identification is correct. After a long search in botanical literature, it was found that Doctor von Martius¹ described in his *Materia Medica* a Brazilian tree called Sebipira, Sicopira, Sebupira, Sebepera, Sepipira, Sucopira, or Sicupira, botanically known as *Bowdichia virgiloides* H. B. K. It was not safe, however, to conclude without further technical investigation that the tree from which this wood was taken is a species of *Bowdichia*.

Pecholtz² made a study of Sicopira gum, and in this connection described the wood of the Sicopira tree as being hard, heavy, very resinous, and highly esteemed in Brazil for all kinds of building purposes. He also stated that the stems yield a fluid known by the

¹*Systema Materiae Medicæ Vegetabilis Brazilianensis, Composuit Car. Frid. Phil. De Martius*. Lipsiæ, 1843.

²*Archiv der Pharmacie*, Januar, 1862.

Indians along the Amazon River as *Cereja de Sicopira*, which means Sico-pira beer. The beer is said to foam very copiously, and to be exceedingly bitter. The wood to be identified is slightly bitter, which is a character in favor of *Bowdichia*. Kalsch³ determined the specific gravity of Sebutira wood to be 1.348. The sample to be identified has a specific gravity of 1.0, which is considerably lighter than the wood Kalsch investigated. The difference in weight, however, does not prove that these are different woods.

The transverse section shows structures that appear, on first glance, to be successive rings of growth having parts corresponding to early and late wood. There is, however, a very marked difference between these two structures. The part corresponding to late wood is very dense and has a wavy outline. A tangential section may therefore show both the more dense and the less dense portions. Since the latter is composed of wood-parenchyma fibers, one might infer that the wood is light in weight and rather soft; yet, on account of the unusually thick walls of wood parenchyma, it is decidedly hard and very brittle. The width of these tangential bands varies from one-half millimeter to one and one-half millimeters, with an average of about one millimeter. Careful observations show that these contrasting structures frequently meet, which proves that they are not concentric zones (annual rings). These bands have such different characters that the radial section shows alternating dark brown and lighter streaks which consist, respectively, of the denser and softer layers of tissue. This structure is so well defined in the radial section that it often resembles the wood of palms.

So far, the anatomical study presents a great many difficulties. The wood is hard and exceedingly brittle, making it almost impossible to obtain good microscopic sections. The radial surface shows that the wood is composed of two kinds of tissue, which, as stated, alternate with each other. The

darker, close-grained layers are composed of very strongly thickened, elongated wood fibers without pits, while the lighter and softer ones consist of vessels and thick-walled wood-parenchyma fibers with pits. The wood fibers are very closely cemented together. The wood-parenchyma fibers are compactly arranged, while the vessels are found scattered singly or sometimes in groups of two to seven in radial direction within the bands of wood parenchyma. The vessels consist of numerous segments placed end to end, directly communicating with one another through extended pit canals, but in the older wood these canals are closed up and communication ceases. The vessels which can be seen with the unaided eye in a smooth cross-section are about sixteen one-hundredths of a millimeter in diameter. The groups of vessels within the bands of wood parenchyma become greatly extended, thus rendering the tangential structures very irregular.

The pith rays in a transverse section are scarcely visible to the unaided eye. They are more strongly thickened and contain more pits than the wood-parenchyma elements. The rays are from two or three rows of cells wide, having one row of rather wide marginal cells above and below. In transverse sections they often seem to be only a single cell wide. Within the tangential bands of wood fibers the pith rays cells have a considerably smaller horizontal diameter than within the bands of wood parenchyma, which can be seen to best advantage in transverse sections.

For a complete study of this wood, it is necessary to have, in addition to the transverse and radial sections, two tangential sections; one through the dense layer of wood fibers and the other through that of wood parenchyma. One is first struck by the presence of two kinds of pits: the bordered pits in the vessel walls, and the simple pits in the walls of the pith-ray cells and wood-parenchyma fibers. In longitudinal sections, the vessel walls show long, slit-like pit openings which are almost as

³*Botanische Zeitung*, Januar, 1863.

wide horizontally as the borders of the pits themselves. The pits are uniformly arranged over the entire surface of the vessels. They are close together, uniform in size, and hexagonal in outline. The partitions between the pit cavities are thin and delicate, resembling the walls of honeycombs. The regularity in the number and occurrence of pits in vessel walls is rarely disturbed, but there are places where the pits are not fully developed; here the pit canals are present and the cavities are wanting. The lenticular pit cavities and the slit-like pit canals can best be seen in transverse sections, especially if the section be treated with a solution of iodine and sulphuric acid or chloriodide of zinc. The pit canals in the cross-walls of abutting vessel segments cannot always be clearly distinguished in longitudinal sections. The canals themselves are often mistaken for partition walls between the adjoining pits. This error may be avoided if one remembers that pit canals always begin where the pit cavities end. The lenticular pit cavities are seen best in longitudinal sections. Where the vessels are adjacent to wood parenchyma, the pits within the walls of the latter are the same as those in pith ray cells, and those within the vessel walls are bordered. The pits in the cells of wood-parenchyma fibers and pith rays are simple, and in vessels they are bordered, resembling those in tracheids of conifers. The pit cavities, however, are not shown so plainly as they generally are in coniferous woods.

The cross walls of vessel segments are now always in close union. The portion between the abutting segments is composed of a soluble substance. By treating thin sections with potassium chlorate and nitric acid, this substance is dissolved, leaving the cross walls distinctly visible. The vessels are developed directly from wood parenchyma, as may be determined from the inter-

mediate forms which are very abundant, especially where more than three vessels are located side by side. Two of these vessels are, then, as a rule, of the usual diameter, and the others are smaller.

The structural characters of this wood are like those of woods related to *Robinia*, *Gleditschia*, *Hæmatoxylon campechianum* L., *Casalpinia echinata* Lam., etc., which are known as leguminous woods. As was said, the occurrence of vessels as vessel cells and not as vessel tubes is characteristic of the woods of this group.

In conclusion, the question to be solved is whether the regular alternating bands of wood fibers and wood parenchyma correspond to annual increment layers. The gross characters showing that they do not coincide with so-called annual rings have already been given above. An anatomical investigation reveals the fact that there are no elements present, either in the parenchyma or prosenchyma layer, which resemble intermediate forms invariably found in that part of the concentric zone where it changes gradually from early to late wood. Nor is there a known wood in which the early growth is composed of tissue wholly different from that formed later.

The facts determined thus far show beyond doubt that it is a leguminous wood. There is no analytical key based on structural characters by means of which it can be traced down to its proper genus. Both the gross and minute characters have been carefully compared with those of authentic samples of *Bowdichia virgiloides*, with which they agree in every particular. The generally accepted trade name for this wood is *Sebipira*, which is also a generic name given to it by Doctor von Martius in 1828. It had been previously described, however, by Humboldt, Bonpland, and Kunth as *Bowdichia virgiloides*.



EDITORIAL

Samuel Bowdlear Green

THE cause of forestry, particularly in the field of forest education, suffered a severe loss in the recent death of Prof. Samuel Bowdlear Green, dean of the school of forestry at the University of Minnesota. When Professor Green took up forestry as his life work, more than a score of years ago, he was a pioneer. The outlook was discouraging in those days. The very word forestry was novel, and its meaning ill understood, while, often enough, to ignorance were added indifference and active opposition. To achieve results, to be a successful leader, in those conditions, required both the power to fight and the discretion to conciliate; it called for a large and many-sided man, knowing thoroughly what was wanted, yet moderate and adroit enough to seize and develop whatever was offered. It was because he possessed these qualities that Professor Green accomplished so much. By persistent and judicious effort, sustained by unflagging pluck and confidence, he built up the course of forest study at the University of Minnesota, carried forestry into practice at Itasca Park, exercised a controlling influence in the development of a state forest policy, won the liking and cooperation of lumbermen, and had the satisfaction, a short time before his death, of seeing the results of his work take permanent shape in a separate school of forestry at the university, and of being its first dean.

The high regard felt for Professor Green among lumbermen is shown in an editorial in *The American Lumberman* for July 23, from which the following is taken:

In Samuel B. Green forestry had a noble champion. He was a sane, conservative, but none the less persistent worker in the cause which in late years had become his life work. Just as the science of forestry itself is the

outgrowth and development of agriculture, so Professor Green, originally a scientific agriculturist, ultimately became a scientific forester. He long ago realized the importance of forestry as a science and he realized also that to succeed forestry must be practical and useful, and he bent his efforts as professor of horticulture in the University of Minnesota to the building up and developing of the forestry work of the university.

Professor Green was essentially of a judicial temperament. He saw both sides of every question. He possessed the one faculty that is indispensable to leadership in any movement in which interests are varied and conflicting. He was not a radical partisan or advocate of any policy, party, or interest. He understood, recognized, and respected the rights and opinions of all. His advocacy was in the direction of education. He knew that the forests must be used to be conserved, and it was his chief end and aim to teach the people to know that true conservation of the forests is synonymous with their proper use. Thus in his policy the theoretical and practical were so combined and harmonized as not to arouse the antagonism or opposition of any interest. He had the fullest confidence and respect of lumbermen and all who knew him.

Professor Green was born at Chelsea, in 1859, the son of Thomas and Anna (Marden) Green. He was graduated from the Massachusetts Agricultural College in 1879, having specialized in forestry and horticulture. He continued his studies in a number of foreign countries. From 1888 to 1898 he was a teacher in these subjects, and in 1898 was appointed to a professorship at the University of Minnesota. He had been an associate editor of *Farm and Fireside* since 1888. Besides his deanship at the school of forestry at St. Paul, he was president of the Minnesota Horticultural Society and of the board of administration, Farmers' Institutes of Minnesota. He was author of a number of books, including "Amateur Fruit Growing," "Vegetable Gardening," "Forestry in Minnesota," and "Principles of American Forestry."

Statesmanship

THE world likes a clean fighter, who makes his fight and if defeated yields without complaint. It also likes the man who fights fair. Theodore E. Burton, junior senator from Ohio, is one of the able men, intellectually, of the Congress of the United States, but he does not fight fair nor yield gracefully to defeat. His filibuster in the Senate, by which he postponed for another year the passage of the bill that would have made possible the salvage of some of our eastern mountain watersheds, remains unexplained on any rational grounds. This is not a job that would justify one or two legislators in blocking its passage, in the face of a majority. It is a popular measure, with no graft or selfish interest behind it. All that Mr. Burton accomplished was to exhibit a personal animus and hold for a little while the center of the senatorial stage, a cheap notoriety that a man of his mental caliber should be above. If we are not mistaken, this petty part will be remembered much longer than some of his more creditable acts of statesmanship. Two comments from able and conservative journals will indicate the estimate that is placed upon the Ohio senator's action. The *Providence Journal* said:

The fact that Senator Burton of Ohio is, generally speaking, one of the most useful and intelligent members of Congress makes his pernicious activity against the bill for the preservation of the Appalachian and White Mountain forests the more discreditable. Without judging motives, it is difficult to absolve him from the charge of having sinned against the light. The importance of the measure is admitted by every real friend of conservation. In the White Mountains, especially, the work of devastation is going on apace. True, the state of New Hampshire is greatly to blame for not following the example of Massachusetts and Vermont and doing something of its own accord to protect its most valuable natural asset. But this fact will not relieve Congress of the odium of failing to pass the Weeks bill. It is distressing that, after the efforts of the Speaker of the House to prevent this legislation have been defeated, a member of the Senate should have the power by a mere exhibition of volubility to disappoint expectation once more.

The second editorial is not from the hotbed of Appalachian forest agitation, but from Senator Burton's own state.

The *Columbus Dispatch*, voicing a sentiment to which the senator may be more sensitive than to that of New England, said:

For five hours, Friday, in the United States Senate, Mr. Burton, talking on a multitude of irrelevant subjects, filibustered to kill the White Mountain and Southern Appalachian forest reserve bill. He succeeded by resorting to legislative sharp practice and misuse of senatorial privilege in preventing a vote on one of the most vital and important measures in the general scheme for the conservation of the natural resources of the country. Secretary Ballinger himself and all the interests in opposition to conservation could not have been more devoted advocates. The junior senator from Ohio was not content to register his individual antagonism, to state his case and make his appeal for reaction. He chose, rather, to stop the machinery of legislation altogether, fearing the majority of the Senate was in favor of the bill and would pass it if accorded an opportunity.

What has led the senator to this championship of the cause of those who despoil the forests and the streams for their own gain? He says he is fighting conservation because of the cost of it. But what of the cost of the failure to conserve the forests? And when did this nation become so poor that it had not money for the necessities of its own existence and prosperity? Mr. Burton is posing as a watchdog of the treasury, but in that role he is a sham. He is serving not the people, but the special interests which he served so conspicuously when he voted almost continuously with Aldrich on the tariff.

When Mr. Burton was elected to the Senate from Ohio he was believed to be a zealous champion of the interests of the people. He was supposed to represent a new order of things. As a senator of the United States he shattered these beliefs and suppositions of public opinion in Ohio almost at the beginning. His record since his elevation to that high office has been more than a disappointment. It has been a calamity.

Mr. Burton was ably assisted by Senator Newlands of Nevada, a conservationist who insists in conserving in his own way or not at all. Mr. Newlands declared his belief in the object of the pending bill, and then talked and voted to defeat it. If Mr. Newlands wishes to win support for his methods and ideas, the way to do it is not to use the club of a filibuster upon the sorely tried patience of the eastern friends of forestry.

The height of statesmanship in the House was reached by the Hon. Edgar

D. Crumpacker of Indiana, in his speech against the bill. He suggested the employment of two old-fashioned windmills with pumps at the head of the Connecticut River as a means of supplying more water in the river and doing "more for navigation than will be done under this scheme in a quarter of a century." The Indiana statesman also said:

Fifty years ago and more the great prairie states in the Mississippi Valley were covered with swamps and sloughs that were saturated with water the year round. They contributed much toward the rainfall in the valley during the hot days of July and the dog-day season. They gave to the atmosphere vapor that went up into the clouds and made rain. Those swamps have all been drained. They are dry. They are farms and gardens now. The government might as well enter upon an undertaking for the common good to re-establish those swamps and sloughs on those fertile lands in the prairie states, with a view to promoting rainfall in the Mississippi Valley.

The *New York Sun* was so impressed with this powerful argument that it remarked, after reviewing the speech at some length: "There were other foolish speeches made in opposition to the Appalachian forest reserve bill, but the palm must be awarded to the Hon. Edgar D. Crumpacker."

If this bill needed more support than the powerful scientific, economic, and legal arguments that have been massed in its behalf during the ten years of discussion, this would be found in the fact that the best its opponents can do against it is typified by the filibuster in the Senate and such arguments as Mr. Crumpacker's in the House.



The Rocks Ahead

ON OTHER pages of this magazine the record in the first session of the present Congress of the Weeks bill for the acquisition of national forests is given at some length. The failure to pass the bill at this session is a bitter disappointment, and the present situation has an element of danger in it which calls for a word of warning.

The fight in the House was successful because, although the Speaker and the House leaders on both sides have steadily opposed the bill, it was in the hands of some of the shrewdest and most resourceful parliamentary fighters in that body, and they put the measure through by sheer hard work.

In the Senate the opposition was far less—so much so, indeed, that we were constantly assured of the passage of the bill by those who had it in charge. Why, then, did it fail in a body where it has always had a comfortable majority in its favor? Simply because it was brought up too late in the session. By holding the bill back to await the action of the House, when an elementary knowledge of the situation would have made it clear that the House would not get at this bill until near the close of the session, an opportunity was fitted to the hand of those senators who, to show their own power or accomplish a personal end, were prepared to filibuster against it.

The President was partly responsible for this delay. Naturally anxious for the success of his especial measures, he did not wish to have anything intervene to block them, and while he desired and recommended its passage, he asked that it be not brought forward until the so-called "Administration bills" were disposed of. The bill might have been reported at any time from the Senate committee on forest reservations, which was unanimously in favor of it, and pushed in the Senate without reference to the House. Then it would have been safe. The game of the filibuster is time, and it is impossible to hold either house in session in the heated Washington weather when a time of adjournment has been fixed upon. The senators did the best they could under the circumstances, but the circumstances should not have arisen.

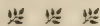
As it now stands, the danger that must be guarded against is the attachment of amendments, making necessary a conference. The bill has passed the House; it will be voted on in the Senate on the 15th of February next; but so will any proposed amendments. It is

possible for the eminent statesmen from Ohio and Nevada to attach amendments to the bill that will throw it into conference if they are accepted by the Senate, and then, with only two weeks remaining of the session, the conference and the succeeding discussion could be prolonged until it would once again be too late to enact the bill.

We ask the senators who support this bill to guard against such a disaster, for it would be nothing less. We ask President Taft to throw the weight of his influence to secure the prompt passage of this bill, most vital, most immediately necessary of all conservation measures, and the only one for which the east has asked.

The delay this year means a heavy loss, especially in the White Mountains. Any further delay, in view of the well-known facts, would be a crime.

There is a strong feeling among many people who know the legislative ways of Washington that there is no intention of passing this bill; that enough is to be done at each session to pacify troublesome constituencies, and that the measure, having been used as a football between the houses, will be allowed to quietly "fall through the slats" at each session. Expressions of this opinion have come to us from so many sources that we believe it may be well for senators and representatives to know that it exists. The country is impatient of anything that looks like unfair play, and the football game has been played, with this bill for the leather, as often as it is safe to play it. The next game must be a fair one in which votes count.



Prize Essays in Forestry

FOUR pupils in the high schools and township schools of Indiana recently carried off as many prizes for essays on the subject of "Forestry in Indiana." The winners were Myrl Ellen Simmons, of Union City; Olive O. Shideler, of Attica; Garfield V. Cox, of Fairmount, and David Erwin, of Fort Wayne. Collectively, the essays give a fairly ade-

quate account of the present situation in the state, while individually they do credit to the writers and their instructors as well written and thoughtful bits of exposition and argument. Most of the salient points are well brought out, and enforced with good sense and in good English. The extent to which the Indiana forests have been exploited in the past, the chief present problem—that of planting, and the value of the farm woodlot as part of the well-balanced use of agricultural land are accurately and convincingly indicated.

There is no more productive soil in which to sow the seed of sound thinking upon forest economics than that offered in the public schools of the country. For a lifetime the pioneers of forestry have been expending immense stores of energy in converting adult minds, educated in days when indifference to the forest, an over-sensitive sense of private rights, and the traditions of half a dozen generations were stubborn counter-tendencies. In overcoming these tendencies there has been great waste of effort; the minds of grown men and women responded but slowly and incompletely. Meantime, the forces that make for forest waste remained in full swing; the speculative view of forest investments, encouraged by experience of quick and rewarding profits, even augmented the speed and magnified the scale of the exploiting process. It became more and more evident that a change for the better could be brought about only by showing the financial advantages of permanent forest management, on the one hand, and by rousing and guiding civic responsibility, on the other. The required means were a sound education in the principles of forestry and a moral enlightenment as to the responsibility of the state for the general welfare; in other words, the development of well considered forest policies, private and public. The foundations for these policies are to be laid most effectively in the schools, where forestry has become at once a cultural study and a department of civics. The Indiana school essays are, therefore, not only thoroughly worth

while in themselves; they have a wider significance as part of the general schooling by which the rising generation will be prepared to handle more efficiently the forest problems of their day.

The Woodlot

FOR the eastern United States, the woodlot is and will long continue to be an important factor in the forestry problem. Generally speaking, the eastern farm has its woodlot, large or small, a very valuable part of the property, and a part that is too little appreciated by its owner.

It follows that the farmers have a direct interest in forestry second only to that of the lumbermen. That the woodlot may be maintained in such condition as to yield a continuous supply of firewood, fence posts, poles, and lumber for home use, with perhaps a surplus for sale, is the object for which its owner should strive, and to this end he should know something of the main principles of forestry and of the special application of those principles to the conditions on his own farm.

As an illustration of what this may mean to him in money, consider an incident that actually happened, involving two New England farmers. Their woodlots were of the same character, the principal growth being pine. One of them had his lot, which he proposed to cut, examined by a forester, who made an estimate of the stumpage value.

The stumpage was then sold to a lumberman at \$7 a thousand.

The same lumberman had been trying to buy the stumpage on the second farmer's lot, and had last offered \$800 for it. Now, as he was going to work the neighbor's lot, he increased his offer to \$1,200, which was accepted, the owner congratulating himself on having pushed the price up \$400. But note the result. From this second lot the lumberman cut 1,000,000 board feet. Had this brought the price that the first lot brought, the owner would have received \$7,000, instead of \$1,200. He gave the lumberman \$5,800 because of his ignorance of the value of his own property.

This is only one case among thousands, but the opportunity afforded for comparison makes it especially valuable for illustration. How many of our farmers know what a bank account there is in the woodlot, and how to make it yield the most interest?

On many of our eastern farms there is land that is more available for tree growing than for modern agriculture, that is neglected and doing nothing—too run out for pasture, too rough for cultivation. A plantation of forest trees on this land would not yield an immediate return, but it would cost little and would enhance the value of the land each year, besides providing for the needs of the future.

The scientific farmer should know something of forestry as well as dairying and horticulture, if he would have his farming well balanced and profitable in all its departments.



NATIONAL FOREST WORK

Boundary Changes in National Forests

Further revisions of the boundaries of national forests were made during July. The President has signed a proclamation eliminating approximately 54,590 acres in Idaho and 5,480 acres in Wyoming from the Targhee National Forest, and dividing the remaining area into two forests. The eliminations are the results of a careful examination made by the Secretary of Agriculture last summer, which showed that the lands now excluded are mainly non-timbered areas of more or less value for grazing or agriculture and not needed for forest or for watershed protection.

By the division, the northern section of the forest remains as the Targhee and the southern section becomes the Palisade.

By other Presidential proclamations, an area of approximately 239,360 acres has been transferred from the Wenatchee to the Chelan National Forest, Washington. The land thus transferred from the eastern border of the one to the western border of the other is a timbered mountain area forming the Entiat watershed. It is believed that the territory can be more satisfactorily administered as a part of the Chelan Forest from the headquarters at Chelan than as a part of the Wenatchee from the headquarters at Leavenworth.

For better administration, the new Chelan Forest was divided on July 1 into two parts.

On July 1 the Black Hills National Forest, the largest national forest in the country, was divided into two units, the new forest consisting of the southern portions of the previous one.

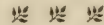
The plan has been under consideration for some time. Besides being the largest forest in the United States, the Black Hills National Forest is ranked as the most important in the matter of business transactions and contains 1,190,040 acres.

The forest had become unwieldy, and a new forest was established by drawing a line east and west through the existing forest, just south of Redfern in Pennington county, making the two forests almost equal in size.

Restocking National Forests

More than ten tons of tree seeds will be used this year on the national forests, in extensive experiments in broadcast sowing and machine planting designed to supplement the more expensive methods of planting nursery stock. Most of this seed has already been planted. The rest will be used later in the season when the right conditions are present. Altogether, the ten tons of seed are equivalent to perhaps 300,000,000 single seeds.

Most of the seed will be sown, either broadcast or in seed spots, or planted with a corn planter, directly in the place where the trees are to stand. Broadcasting has already been found to give good results in some regions. It was first tried in the Black Hills of South Dakota, with an encouraging outcome.



Planting Work

Forest planting work on the Fishlake, Manti, and Nebo national forests was very successful during the past year. In the region where these forests are located, approximately 4,000,000 acres of land need to be reforested. Sooner or later, this big task must be accomplished. During the past few years a great deal of knowledge of conditions was obtained and much has been learned about how best to meet them. Already a good beginning has been made. Three large tree nurseries have been established, one on the Wasatch Forest near Salt Lake City, one on the Uinta, and one near Pocatello. Ten million plants are growing in these nurseries this summer. A great deal of planting will be done in the fall.



Damage from Porcupines

Porcupines have been giving so much trouble by girdling seedlings in certain national forests that the work of exterminating them has been undertaken by the Forest Service in cooperation with the Biological Survey. The porcupine feeds to a large extent in winter upon the inner bark of young pines. Methods of poisoning are being investigated in both the Colorado and California national forests, where the most trouble is experienced. Dr. N. Dearborn and Prof. D. E. Lantz, of the Survey, have recently visited the Routt and the Pike forests, in Colorado.

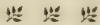
STATE WORK

The New Lookout Station in New Hampshire

A map has been prepared showing the location of the present forest fire control stations in New Hampshire and those which the state forester desires to add to the system.

The thirteen lookout stations which are in operation, in course of instruction, or for which the money has been subscribed, are located in Pittsburg, Dixille, Millsfield, on the peaks of Mounts Madison and Washington, in Bethlehem, Bartlett, Liermore, Benton, and Croydon. These are so placed as to command a wide view and to practically protect the northern section of the state from forest-fire loss, although the chain will be more complete if the state forester can secure the funds necessary to build stations in Sandwich, on Mooselake, in Albany, and in Bean's Purchase.

Returns from forest fires for the first six months of the year show heavy losses in the lower counties by reason of the unusually early spring and the long-continued dry weather.



Fire Protection in New York

Following the enactment of new fire protective legislation in 1909, a year of experience with the law demonstrated the need of establishing a fourth fire district in the Adirondacks. Commissioner James S. Whipple recommended this step in his report for the year 1909, and an act of the legislature which amends the forest, fish and game law provides for the additional district and another fire superintendent to take charge of it.



PENNSYLVANIA

Corporation Owners Taking up Forestry

Corporations having large holdings of land have recently sought the advice and assistance of the Pennsylvania department of forestry in taking care of their timber lands. This branch of the work has become so well established that it takes up practically the entire time of George H. Wirt, who was formerly in charge of the state forestry school at Mont Alto, but who is now in the office of the department.

Among the requests for assistance of this character which have recently been received are one from one of the large anthracite coal companies of the state and another of a similar character from one of the large bituminous companies. In each case, the coal corporations own outright the land in which they mine—surface as well as coal deposits—and the officials desire to do the best they can with the timber.

Some of the tracts brought to the attention of the Commissioner of Forestry have good stands of timber on them, which it is the desire of the owners to preserve and to better; other lands are bare because of the devastating fires, and these it is desired to restock with timber. Whatever the circumstances, a comprehensive scheme of treatment is outlined after an inspection of the premises and all possible advice and assistance given.

Several lumbermen in the western part of the state are planning to protect and manage their holdings according to the instructions of the department of forestry. One of them told the commissioner that he had cut considerable timber and now wants to redeem himself by planting some trees; he will set out about forty acres next spring. A number of other lumbermen are contemplating similar planting.



The State Forest Academy

E. A. Ziegler has become director of the State Forest Academy, at Mont Alto, succeeding George H. Wirt, who has become the chief forester for the state forestry commission. The state reserves now cover practically 1,000,000 acres, and are administered by thirty foresters trained in the State Forest Academy. This number is being increased by about ten men annually.

Mr. Ziegler is a college graduate and has also been with the United States Forest Service for a number of years, serving in the office and the field as well. During that time his work was devoted mainly to forest mensuration. The assistant director, I. T. Worthley, is also a trained forester, a graduate of the New York College of Forestry at Cornell, and a member of the only class that ever graduated at that institution. He has also taken forestry work at Yale and Harvard. These two men have charge of the forestry branches. In addition to these, there are two more instructors in the allied subjects.

EDUCATION

The Educational Question

The question of the proper curriculum for a forest school was freely discussed at the forestry convention, held in Washington last January. Many points of view were presented, and there were many papers pro and con each way. Some of these points were very well taken, and will undoubtedly tend toward a uniform standard in all the schools in the country. There are some, however, which seem to be receiving more attention than they rightfully deserve.

One point, especially, which was threshed over and over was the question of whether it is the duty of the school to give instruction in "practical" work. The opinions on the subject seem to be widely divergent, but will not a careful analysis of these opinions show that it is mostly a seeming difference, and that the real difference lies in the definition of "practical work?" Some take the stand that all work taught outside the classroom is "practical;" others apply the term only to such manual labor as bears but indirectly on the science of forestry. Some are in favor of "practical" work, others think that it has no place in the school at all. In any case, they all seem to agree—such is the only inference—that all classroom work is impractical. Of course, that is not at all what is meant, but it is the impression given. All work is practical, whether given in the classroom or field, if it teaches anything useful; if it does not teach anything useful, it should be cut out in no matter what class it may happen to belong. On this same principle, all useful (practical) work which can be learned more readily in the school than anywhere else should be included in the regular course.

It has now, for many years, been the tendency in the development of modern educational work to do more and more of the teaching in scientific lines in the laboratory. Ocular demonstration will teach the average student more in a week than he can learn in the class-room in a month. This has been generally accepted in most lines of work; why should we deny its application in the teaching of forestry? The nursery and the forest form the laboratory for the work in technical forestry. One afternoon's work in the seed bed will teach more of the handling of seedlings than a month of lectures, and no amount of instruction can take the place of a little actual practice in thinning. The one supplements the other, and only the two together can make an efficient worker; with the ability and self-reliance to carry on independent work. That much of the practical is absolutely necessary, probably even the strongest supporters of the strictly theoretical would not deny.

The work which meets the most objection is that in the lumber camp, sawmill, and national forest. It is held that this is not the proper work for a school and can be learned better elsewhere. This is partly true in that there is not the time to take it up in the short period allotted to school work. It is, however, an important part of the forester's training. The properly trained forester is supposed to know thoroughly all the work connected with the formation, care, harvesting, and marketing of the timber crop. He should know enough about them to supervise and direct all these operations.

Any captain of industry, whatever the particular industry may be, will tell you that a man cannot be a successful director, no matter how complete his theoretical training may have been, unless he has worked through all the stages of the business and learned all the details. This is no less true in forestry than in anything else. The more of such work a man has had, the better prepared he is to take up his life work, to perform the duties of a forester. This is true in Germany, where the theoretical side has been most highly developed, and it is even more true in the United States, where the forester is more closely mixed up with these lines of work. It is a well-known fact that the school graduate must serve a year or two of apprenticeship before he is capable of doing his work. This is true in any profession, and cannot very well be entirely remedied, but it can be helped some. The more of this apprenticeship work that can be done before graduation, the less there is to do afterward, and the better prepared the graduate is. The practice work should never be allowed to interfere with the theoretical and scientific studies—for these cannot be obtained anywhere else—but all of it that can be sandwiched into the spare hours is so much gained.

Vacations passed in this way are invaluable. The insight gained on the nature of the work and the knowledge of woods conditions enable the student to discriminate in his subsequent studies and see the application of theories he is learning. Many things which he would have otherwise been obliged to take on faith, and only half understand, are perfectly clear when fitted into their proper place in the field of his experience. The same amount of this work, after graduation, would not be nearly so beneficial. Many of the theories which the student should then apply he will have forgotten because he only half understood them when he studied them.

If these premises are correct, it follows that all such work is essential to a proper school training. Let all the work of the school be practical, and let there be as much practical work as possible.—*The Minnesota Forester.*

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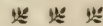
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- Bulletin de la Société centrale forestière de Belgique, June, 1910—A propos de la provenance des graines de pin sylvestre, by E. de M., p. 389-94; Le pin cembro, p. 395-7.
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- Forestry quarterly, June, 1910—The cost of forest mapping and estimating in Montana, by K. W. Woodward, p. 147-57; The effect of grazing on forest conditions in the Caribou national forest, by E. R. Hodson, p. 158-68; Comparison of large and small sawmills on Tahoe national forest, by M. B. Pratt, p. 169-73; Yield tables of western forests, by E. I. Terry, p. 174-7; Notes on the wood structure of the Betulaceæ and Fagaceæ, by I. W. Bailey, p. 178-85; Forestry in the agricultural colleges and experiment stations, by S. B. Green, p. 186-90; Notes of a civil engineer on a forester's education, by F. B. Knapp, p. 196-7; The place of forestry in general education, by H. A. Smith, p. 191-5; Growth of the Forest service library, by H. E. Stockbridge, p. 198-200; Some European forest notes, by C. E. Bessey, p. 201-9; A supervisors' meeting, p. 210-21.
- Indian forester, April, 1910—Indian state forestry, by S. Eardley-Wilmot, p. 179-91; Notes on the forests of Heppenheim in Hesse-Darmstadt, by F. Cowley-Brown, p. 191-202; The bamboo forests of the Ganges Division, U. P., by B. A. Rebsch, p. 202-21; Effect of rainfall on forests, by E. Batchelor and R. S. Pearson, p. 222-5.
- Revue des eaux et forêts, May 15, 1910—Insectes nuisibles aux arbres forestiers de l'Inde, by E. H., p. 303-7; Alcohol ordinaire tiré du bois, p. 314-15.
- Revue des eaux et forêts, June 1, 1910—Divisions botaniques et régions forestières de l'Algérie, by G. Lapie, p. 324-8; L'impot forestier en Allemagne, by A. Arnould, p. 328-39; Le problème sylvo-pastoral dans l'Italie du sud, by J. Diner, p. 339; Forêts inexploitées en Chine, p. 347-9; La distillation sèche du bois avec la vapeur surchauffée, p. 349-50; La situation forestière dans l'Afrique du Sud, p. 350-2; Tarif général de cubage pour l'estimation en bois et résine des coupes de pins maritimes dans la région du Sud-Ouest, by P. Biquet, p. 353-67; Tarière de Pressler, by A. Schaeffer, p. 367-70.
- Zeitschrift für forst- und jagdwesen, May, 1910—Veränderungen des bodens durch aufforstung bisheriger ackerländereien, by Fricke, p. 259-64; Der Kameruner küstenwald, by M. Büsgen, p. 264-83.



Oregon Pamphlet



In a pamphlet just sent out by the Oregon Conservation Association, it is stated that the association is working for the following items: Protection of timber from fire, protection of immature timber from destruction and waste, reforestation of burned and cut-over areas, protection of forests from destruction by insects, fish and game protection, topographic surveys and inventories of state resources, development of inland waterways and good roads throughout the state.

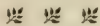
It is also stated that the association is not working for politics, prevention of legitimate development, legislation for the benefit of any class, or legislation against any particular class.

NEWS AND NOTES

Congress of Experiment Station Workers

For the first time, the United States is to be represented among the forest experiment station workers of the old world. The United States Department of Agriculture is a member of the International Association of Forest Experiment Stations, and the Forester has designated Prof. Filibert Roth, of the University of Michigan, as the representative of the Forest Service at the convention of the association, which will be held in Brussels in September in connection with the Brussels centennial exposition.

This first participation of the United States in a meeting of the international association is most significant. It means that this country has begun to work out original experimental results in forestry which are considered worthy of being presented before European foresters; and it means, too, that American foresters are to gain all the advantages which must come of active cooperation with forest experiment station workers throughout the world.



Forestry in Missouri State University

The curators of the University of Missouri have voted to establish a school of forestry at the university.

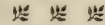


Reforestation to Protect Water Supply at Guelph

The city of Guelph, which stands foremost in the Dominion of Canada as regards municipal ownership of public utilities, is now started upon a new enterprise. About four and one-half miles from the city, and well above it, lie 168 acres of land surrounding the springs which provide the city with water; over one-fourth of this is already well supplied with trees, but the need for further forest protection of the springs was seen by the people to be imperative, as the demand upon the water supply was increasing with the city's growth. Accordingly, the city has set out 40,000 young trees in the locality. White pine, Norway spruce, larch, and Scotch pine have been used, about thirty acres having been planted up to date.

The cost has been \$13.23 per acre, which cost is for the trees, planting, and care only, the value of the land not having to be considered, as it had no rental value, for, owing to its position relative to the water supply, it

had to remain idle. The trees are reported to be doing well after the first few months' test.—*Christian Science Monitor* (Boston).



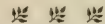
Good Results at Corbin Park

J. G. Peters, of Washington, chief of the office of state and private cooperation in the United States Forest Service, and State Forester Edgar C. Hirst, of New Hampshire, have recently inspected the forests in Corbin Park, N. H.

Mr. Peters' visit to New Hampshire is for the purpose of inspecting the forests which have been worked under plans furnished by the government, and in the case of Corbin Park, Mr. Peters found that the recommendations in the matter of cutting and reforestation had worked out admirably.

There are from 18,000 to 20,000 acres of forest lands in the park enclosure, and while 3,000,000 feet of lumber were taken out last year, it was done so scientifically that little evidence of it is presented.

The work of reforestation has gone along with the cutting. In places the cut-over spaces have been replanted with new trees, while in others the trees have done their own seeding and the young growth is coming along well.



Pennsylvania Railroad Nursery

There is a sharp lesson, and encouragement, in the record for rapid forestry reached at the nursery of the Pennsylvania Railroad at Trenton, where 27,000 saplings one year old have been taken out of a space four by twenty-four feet. If the Pennsylvania Railroad can do this, others can—and should, for profit.—*Boston (Mass.) Advertiser*.



Large New Canadian Reserve

The entire slope of the Rocky Mountains, from the international boundary line northward to within a short distance of the Fifty-fourth parallel of north latitude, is now reserved from settlement or occupation and will be administered entirely with a view to the proper utilization and reproduction of the forest, the protection of the water supply of the prairie provinces and other related objects. Such is the effect of an order-in-council just passed.

The total area of the district now reserved from settlement along the eastern slope of the Rockies in Canada is about 14,400 square miles. On the additional 48,000 square miles just reserved, the effect of the reservation will be to withdraw the timber from disposal under license. It is not intended, however, to withdraw the resources of the area from use, and the use of timber, minerals, stone, and other building materials, under certain specified restrictions, will not only be allowed, but encouraged. For hunting and trapping, it will be necessary to have a permit. The reserve will be under the administration of the forestry branch of the department of the interior.—*Chicago Record-Herald*.



Must Look to Her Senators and Representatives

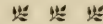
The agreement which was reached in the Senate before Congress adjourned that a vote upon the Weeks Forestry Bill should be taken on February 15 next is cause for some consolation in the face of a failure to enact that measure at the present session. If reports from Washington are to be trusted, there is little reason to doubt the passage of the bill at that time; although there is some danger of the insertion of amendments, and the consequent possibility of its being held up in conference between the houses. New England will have to look to her senators and representatives to avert any such disappointment. But, at the best, the fact remains that the taking effect of this imperatively needed legislation has been postponed practically another year, and that the destruction of the forests, which might otherwise have been protected, will continue through another winter's lumbering season. It is impossible to definitely assert what "might have been," yet it is not improper to suggest that had the forestry bill been brought up earlier in the session by Senator Brandegee of Connecticut, as he was earnestly urged to do by the advocates of the measure, there would have been far less incentive to employ obstructive or filibustering tactics against it such as were only too effectively followed by Senator Burton of Ohio. The appearance of any bill in the closing days of a congressional session always offers a temptation to the cantankerous to obstruct its passage, because of the knowledge that only a comparatively brief objection will cause it to fail. It is open to serious doubt whether Senator Burton would have felt impelled to make his stand had the bill been brought forward at an earlier date.—*Springfield Republican*.

Annual Meeting of New Hampshire Society

The annual meeting of the Society for the Protection of New Hampshire Forests will be held on August 2 and 3 at Bretton Woods. There will be an important conference on the forest reserve bill to which a number of distinguished public men have been invited. Among those who have accepted are Congressmen Currier of New Hampshire and Lawrence of Massachusetts.

The New Hampshire forestry commission is to hold, on the afternoon of the first day, a convention of the town forest fire wardens of the state. Among the topics for discussion there will be "Forest Taxation," "State and Town Forests," "Gypsy and Brown-tail Moths," and the "Plan for Local Forestry Associations in the Towns." Forest planting and the condition of the mountain forests will be pictured by the stereopticon. All of the sessions will be open to the public.

The sessions will be presided over by the Hon. Frank W. Rollins, the president of the society, and by the Hon. Robert P. Bass, chairman of the state forestry commission.



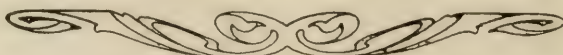
Eucalyptus in California

George M. Homans, state forester of California, after inspecting 3,000 acres of eucalyptus plantation in Escondido, Bernardo, and Encinitas, expressed himself as highly pleased with the results which have been attained in the growing of eucalyptus in this section.

Mr. Homans, who recently succeeded G. B. Lull in the office of state forester, has been on a tour of inspection over the state, with especial reference to the eucalyptus industry. It is the idea of his department, he says, to secure all the official data possible concerning the industry and to lend its fostering influence to it.

Mr. Homans states that California is taking the lead in the raising of eucalyptus. The acreage of eucalyptus in California is now said to be greater than the acreage of all the remaining states of the Union. In the years 1909-1910 more than 23,000 acres were set out to eucalyptus trees in California. It is the opinion of Mr. Homans that the industry will become an important one in the state.

Mr. Homans visited the 600 acres of eucalyptus at Bernardo, planted by the Eucalyptus Culture Company of San Francisco; the 700 acres planted by the Pratt Eucalyptus Company of Los Angeles, under the direction of S. J. Flinham, and the 1,700 acres planted by the Santa Fe Railway Company near Encinitas.—*Los Angeles (Cal.) Examiner*.



STATE FOREST OFFICERS

Important changes have taken place during the past year in both the organization and the personnel of the state forest departments, and similar changes are taking place constantly. In order to record the progress made, as well as to invite corrections and make the list complete and accurate, a table of state forest officers, with their titles and addresses, is printed below:

STATE FOREST OFFICERS

State or territory	Name and post-office	Official position
Alabama	John H. Wallace, Jr., Montgomery.	Commissioner, department of game and fish.
California	G. M. Homans, Sacramento.....	State forester.
Connecticut.....	S. N. Spring, New Haven.....	State forester.
Hawaii.....	Ralph S. Hosmer, Honolulu.....	Superintendent of forestry.
Indiana.....	Charles C. Deam, Indianapolis....	Secretary, state board of forestry.
Iowa.....	C. A. Scott, Ames.....	Forester, agricultural experiment station.
Kansas.....	{ Henry Cooper, Dodge City.....	Commissioner of forestry.
	{ F. H. Ridgway, Ogallah.....	Commissioner of forestry.
Kentucky.....	M. C. Rankin, Frankfort.....	Commissioner, department of agriculture, labor and statistics.
Louisiana.....	F. J. Grace, Baton Rouge.....	State forest commissioner.
Maine.....	Edgar E. Ring, Augusta.....	Land agent and forest commissioner.
Maryland.....	F. W. Besley, Baltimore.....	State forester.
Massachusetts...	F. Wm. Rane, Boston.....	State forester.
Michigan.....	{ Marcus Schaef, Roscommon.....	State forester.
	{ Filibert Roth, Ann Arbor.....	State forest warden.
Minnesota.....	Gen. C. C. Andrews, St. Paul....	Forestry commissioner.
Montana.....	Charles W. Jungberg, Helena....	State forester.
New Hampshire...	E. C. Hirst, Concord.....	State forester.
New Jersey.....	Alfred Gaskill, Trenton.....	Secretary, forest park reservation commis- sion, and forester.
New York.....	{ James S. Whipple, Albany.....	Commissioner, forest, fish and game com- mission.
	{ C. R. Pettis, Albany.....	Superintendent of state forests.
North Carolina..	J. S. Holmes, Chapel Hill.....	Forester.
Ohio.....	Edmund Secrest, Wooster.....	Forester, state agricultural experiment sta- tion.
Oregon.....	{ J. W. Baker, Cottage Grove.	Forestry, fish and game warden.
	{ A. B. Wastell, Portland.....	Secretary, state board of forestry.
Pennsylvania....	Robert S. Conklin, Harrisburg...	Commissioner of forestry.
Rhode Island....	Jesse B. Mowry, Chepachet.....	Commissioner of forestry.
Tennessee.....	H. A. Morgan, Knoxville.....	Director, college of agriculture and ex- periment station.
Vermont.....	Austin F. Hawes, Burlington....	State forester.
Virginia.....	G. W. Koener, Richmond.....	Commissioner, department of agriculture and immigration.
Washington....	{ R. W. Condon, Port Gamble.....	Chairman, state board of forest commis- sioners.
	{ J. R. Welty, Olympia.....	State firewarden and forester.
West Virginia...	A. B. Brooks, Morgantown.....	State forester.
Wisconsin.....	Edward M. Griffith, Madison....	State forester.

STATE FORESTRY ORGANIZATIONS

A list of state forestry associations and their secretaries is printed below. Corrections in this list will be carefully recorded by AMERICAN FORESTRY.

Name of organization	Secretary	Address
Appalachian Mountain Club.....	R. B. Lawrence.....	Tremont Bldg., Boston.
Arizona—Salt River Valley Water Users' Association.	Charles A. van der Veer..	Phoenix.
California—Water and Forest Association....	I. C. Friedlander.....	1405 The Merchants Exchange Bldg., San Francisco.
Forestry Educational Association.....	E. C. Damon.....	San Diego.
Sierra Club.....	William E. Colby.....	San Francisco.
Pacific Coast Forest, Fish and Game Association.	Wm. Greer Harrison...	San Francisco.
Tri-counties Reforestation Committee.....	Miss L. A. Finch.....	Riverside.
Colorado Forestry Association.....	Ellsworth Bethel.....	Denver.
Connecticut Forestry Association.....	F. H. Stadtmüller.....	Elmwood.
Georgia Forestry Association.....	Alfred Akerman.....	Athens.
Iowa Park and Forestry Association.....	Welsey Greene.....	Des Moines.
Maine Forestry Association.....	Edgar E. Ring.....	Augusta.
Massachusetts Forestry Association.....	Irving T. Guild.....	4 Joy St., Boston.
Michigan Forest Association.....	H. G. Stevens.....	25 Band Chambers, Detroit.
Minnesota State Forest Association.....	E. G. Cheyney.....	St. Anthony Park.
Nebraska Park and Forestry Association....	Miss Leila B. Craig....	York.
New England Forest, Fish and Game Association.	Arthur T. Harris.....	16 State St., Boston.
New Hampshire—Society for the Protection of New Hampshire Forests.	Allen Hollis.....	Concord, N. H.
New York—American Forest Preservation Society.	Geo. Milroy Bailey.....	Corfu, N. Y.
Forestry, Water Storage and Manufacturing Association of the State of New York.	Chester W. Lyman.....	1 Broadway, New York.
Northern New York Forestry Association..	O. B. Trappan, Director.	Potsdam, N. Y.
State of New York Fish, Game and Forest League.	L. C. Andrews.....	Elmira.
The Association for the Protection of the Adirondacks.	Edward Hagaman Hall.	Tribune Bldg., New York City.
North Dakota State Sylvaton Society.....	Miss Ella J. Mitchell...	Penn.
Ohio—Cincinnati Forest and Improvement Association.	Adolph Leue.....	127 West Twelfth St., Cincinnati.
Ohio State Forestry Society.....	Prof. J. J. Crumley....	Wooster.
Oregon Conservation Association.....	A. B. Wastell.....	904 Lewis Bldg., Portland.
Pennsylvania—Franklin Forestry Society....	W. G. Bowers.....	Chambersburg.
Pennsylvania Forest Association.....	F. L. Bitler.....	1012 Walnut St., Philadelphia.
Vermont Forestry Association.....	Ernest Hitchcock.....	Pittsford.
Washington Conservation Association.....	Clarence H. Bailey.....	P. O. Box 236, Seattle.
West Virginia Forestry Association.....	A. W. Nolan.....	Morgantown.

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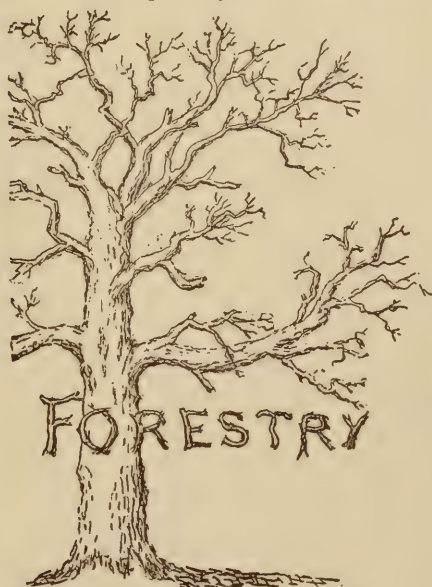
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PROTECTION OF FORESTS FROM FIRE

By HENRY S. GRAVES

A FORESTER WHOSE FIELD IS THE CITY

By C. D. MELL

THE REFORESTATION OF DENMARK

By WILLIAM HOVGAAARD

THE STORY OF MANTI

By WILL C. BARNES

FORESTRY WORKERS IN NEW
HAMPSHIRE

By EDWIN A. START

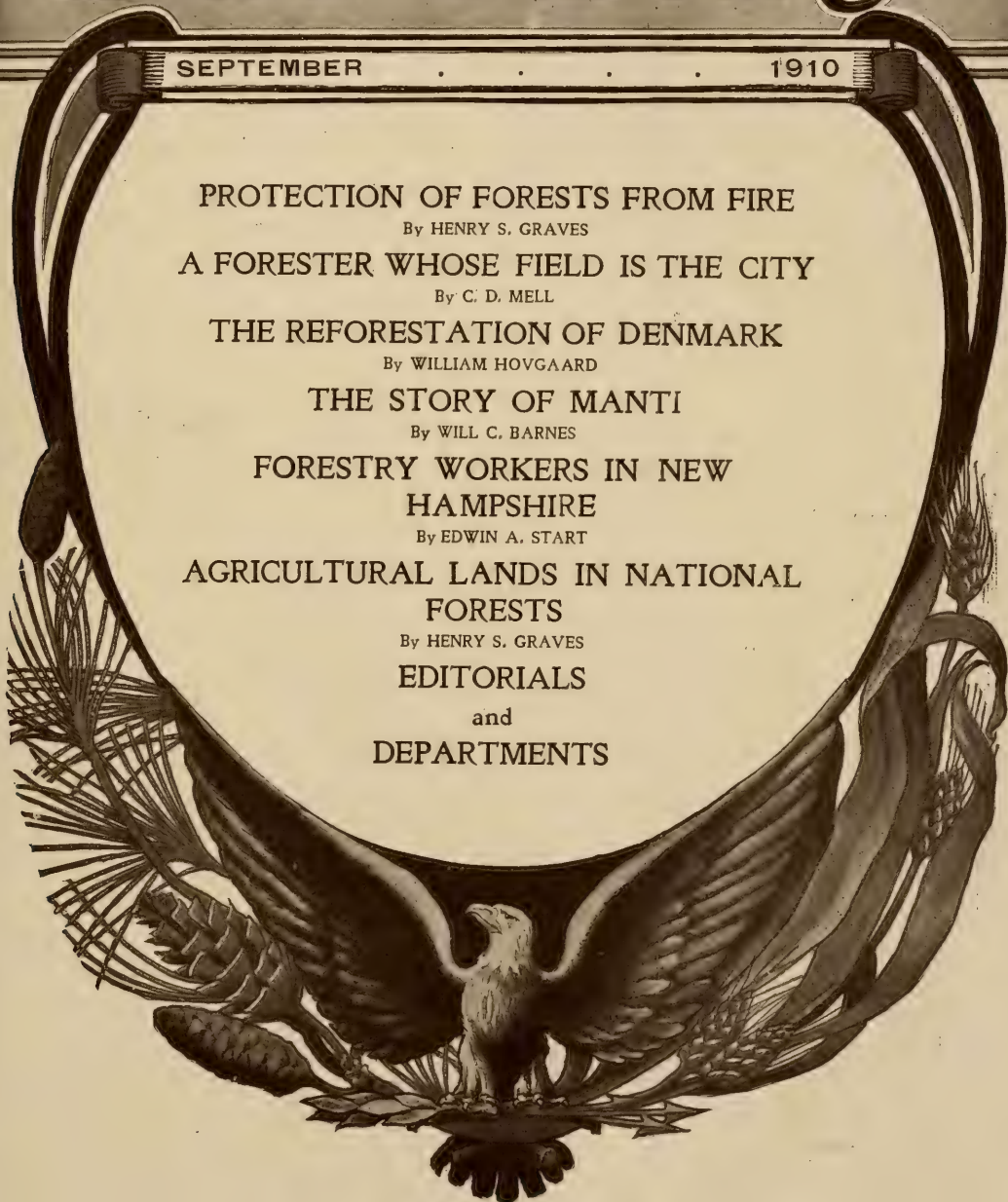
AGRICULTURAL LANDS IN NATIONAL
FORESTS

By HENRY S. GRAVES

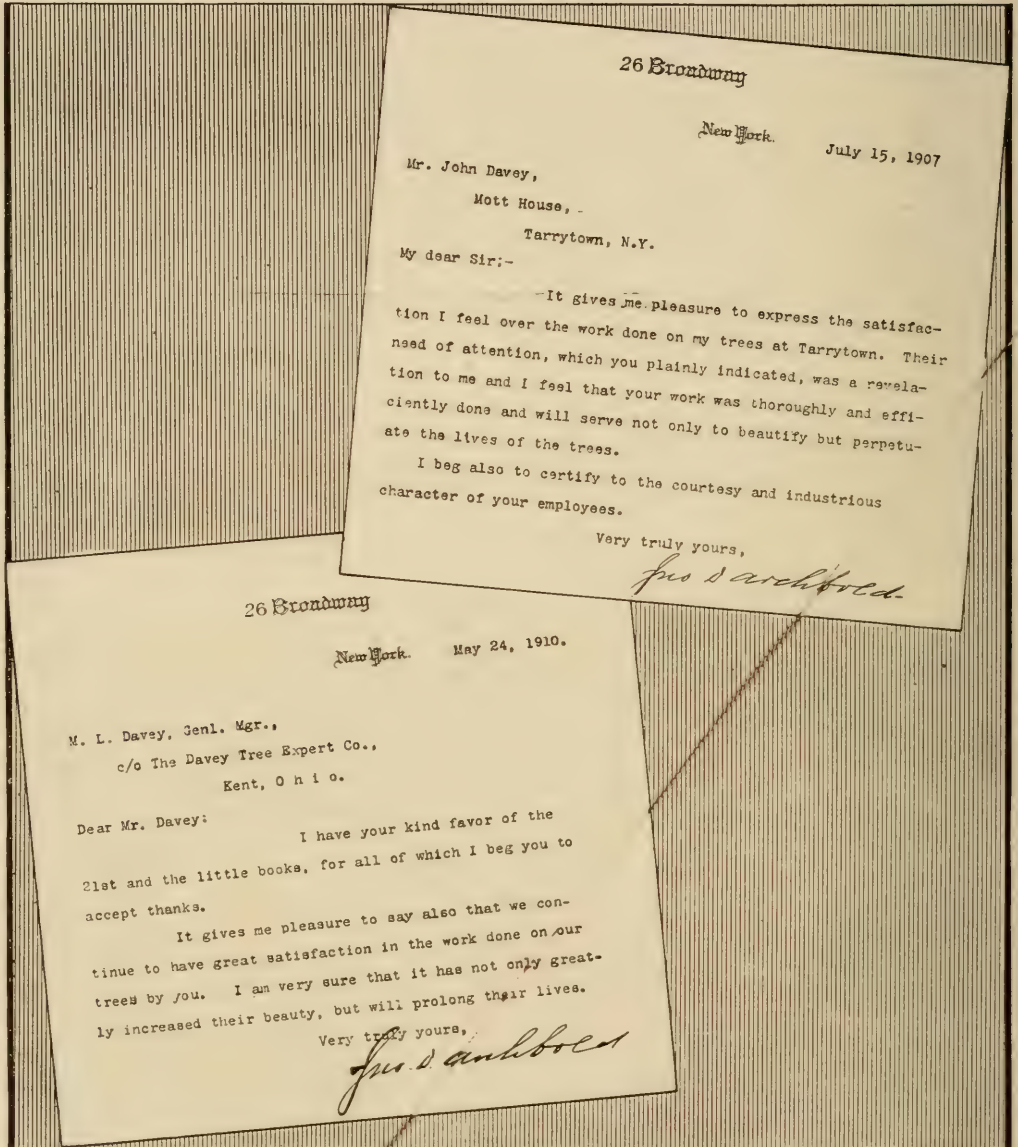
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Indexes for Vol. XV (1909) are ready and may be had on application

The American Forestry Association

is a national organization composed of public-spirited citizens who are interested in the prevention of the wholesale destruction of our forests, in forest extension and utilization, and in the fullest cooperation of national, state, municipal, and private agencies for these purposes. The Association has no business or governmental ties or alliances. Its work is to educate the people to know and understand the value and necessity of forests in the Nation's life and the way to maintain them to the best advantage through scientific forestry; and to bring about such wise legislation as will best secure the desired results. It is the people's forestry advocate and the representative of forestry before the people.

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MAGAZINE DEPARTMENT.—This department publishes *American Forestry*, the only popular monthly magazine of national circulation in its field. It has a strong force of editors and contributors and is well illustrated. The subscription price is *two dollars a year*.

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Vol. XVI

SEPTEMBER, 1910

No. 9

THE PROTECTION OF FORESTS FROM FIRE

By HENRY S. GRAVES
Forester, U. S. Department of Agriculture

(Owing to its great importance, Bulletin 82 of the Forest Service, which has just been published, will be reprinted entire in American Forestry, in six instalments, of which this is the first.)

INTRODUCTION

THE first measure necessary for the successful practice of forestry is protection from forest fires. As long as there is any considerable risk from fire, forest owners have little incentive to make provision for natural reproduction, to plant trees, to make improvement cuttings, or to do other work looking to continued forest production.

In many localities great progress has lately been made in forest protection. Organized fire protection has been established in the national forests and in most of the state forest reservations. A number of states have begun to develop systematic fire protection on private lands through the organization of state firewardens. In some instances private owners have formed cooperative associations for fire protection and employ a regular force of rangers for patrol during the fire season. The most conspicuous and successful associations are those formed by certain lumber companies in Idaho and Washington.

Throughout the country there are here and there instances of serious effort toward thorough fire protection by individual private owners. In spite of all that has been done, however, the fact remains that most of the forests of the country, particularly those privately owned, are inadequately protected from fire. It is probable that in fully seventy-five per cent of the private forests there is no attempt whatever at systematic protection.

CHARACTER OF FOREST FIRES

It is customary to distinguish three classes of forest fires, as follows:

(1) *Surface fires*, which burn the surface layer of dry leaves and other litter, dry grass, brush, and small trees.

(2) *Ground fires*, which occur where the mineral soil is covered with a deep accumulation of vegetable mold, and which, on account of the peaty character of the material, burn much more slowly than surface fires.

(3) *Crown fires*, which burn through the crowns of the trees.

SURFACE FIRES

Nearly all forest fires start as surface fires. The dry litter on the surface of the ground is ignited by a spark, perhaps from a locomotive or a campfire. At first the fire burns in a small circle, gradually eating out in all directions. If there is a wind, the fire burns with greatest intensity on the leeward side, and quickly assumes an oval form. If the wind is very strong, the fire may die out entirely on the windward side, but it burns intensely on the other side, soon developing a distinct front or head, with side wings running diagonally with the wind. At first the front of the fire is very narrow, but it gradually widens and takes the form of a broad, irregular line. The front may reach indefinite proportions, from a few hundred feet to a number of miles in width. Irregularities of topography and differences in the amount of inflammable material cause the fire to burn more rapidly in some spots than in others, so that the entire front becomes scalloped and irregular.

Ordinarily a surface fire simply burns along the ground and does not get into the tops of the trees. Sometimes, however, the flames reach up into the crowns and scorch them, or even ignite them here and there; but such a fire still has the character of a surface fire, unless it actually burns through the crowns.

The manner of burning, the form of the fire area, the rapidity of burning, and the intensity of the fire depend upon the following conditions:

- (1) The character and quantity of inflammable material.
- (2) The topography.
- (3) The character of the soil.
- (4) The condition of the atmosphere.

Inflammable Material

The severity of a surface fire depends largely on the quantity of dry material in the forest. If there is an accumulation of leaves representing the fall of a number of years the fire is much more severe than if the litter is the result of the fall of only a

year or two. The quantity of accumulated litter is greatest with species having large leaves and large crowns. Maple and red oak, for example, make a heavier litter than ash or birch; white pine makes a heavier litter than pitch pine. The severity of a fire depends further on the character of the leaves. A layer of resinous softwood needles burns more rapidly and with a hotter fire than does a layer of hardwood leaves.

The amount of dry wood on the ground influences largely the severity of a fire. In some types of forest there are a great number of fallen dead trees, which litter the ground, and thus increase the fire danger. This is well illustrated in the lodgepole pine forests of the Rocky Mountains. In localities subject to windfall there is likely to be a large amount of fallen timber, while fires, disease, and insects leave standing dead trees and snags, which are easily ignited. After lumbering in the old-fashioned way, the ground is covered with a mass of tops and rejected logs, which soon become dry and highly inflammable.

Again, the condition of the litter and débris governs largely the character and severity of the fire. The most severe fires occur where the material is thoroughly dried to the mineral soil. When the material is only partially dry the fire is slow and the litter is not completely burned.

Since the ground litter is, as a rule, unevenly distributed, a surface fire burns very irregularly. Still another cause of the irregularity of surface fires is the varying soil moisture.

Topography

A fire runs uphill with great rapidity, because the heated air currents draw the flames upward. If the litter is evenly distributed, the velocity with which a fire will run up a slope is in direct proportion to the steepness of the slope. After passing the crest, a fire travels slowly in its descent on the other side.

Mechanical obstructions, such as abrupt walls, narrow ridges, outcrop-

ping ledges, and so on, tend to check a fire and to prevent its gathering volume. On extensive level ground, fires burn more uniformly, gather a greater volume, generally do more damage, and extend over a larger area than in rugged topography.

Character of the Soil

Any influence which tends to dryness increases the intensity of a fire. Thus on sand and limestone soils, which warm up and dry out readily, fires are likely to be very severe. Southern and western slopes are apt to be more severely burned than others, because they are the warm and dry exposures.

Condition of the Atmosphere

The character of a fire is influenced, further, by the condition of the atmosphere. Roughly, the greater the velocity of the wind, the more rapid is the progress of the fire. A fire burns more severely when the wind is constant than when it is gusty. It is the steady high wind which makes the most intense fire.

A fire burns most fiercely when the atmosphere is dry. Fires are, therefore, most severe during the hot part of the day and when fanned by a dry wind. A moist atmosphere retards a forest fire. The well-known fact that the night is the best time to fight a fire is thus explained; for at night there is usually little or no wind, while the air is comparatively heavy and damp.

Rapidity of Surface Fires

No reliable estimate of the rapidity of surface fires can be made, because it varies so greatly under different conditions. In the hardwood regions of the east a surface fire seldom travels more than five miles a day, but in the coniferous forests of the west instances are known where this rate of speed has been more than doubled.

Grass Fires

In nearly all open forests there is a certain quantity of grass which, when dried, carries fire very rapidly. In many forests the presence of grass constitutes one of the important problems connected with surface fires. This is particularly true in the southern pine forests.

A grass fire is more influenced by the density of the grass than by its height. Where the grass is in separated patches, with no leaves or other inflammable material between, it is difficult for a fire to spread. Uniformly dense grass burns with the greatest intensity. High grass burns with greater intensity than low grass, but the fire does not usually run so rapidly. Grass a foot high, if dense, may produce such a hot fire as to start a crown fire. In short grass, with an ordinary wind, a fire will run from three to four miles an hour; with a high wind, twice as fast. The chief factors affecting the burning of grass are its dryness and the force of the wind. Other factors have their influence, however, just as they do in the burning of litter.

Brush Fires

Bushes and small trees frequently retain many dried leaves late into the fall, and in some cases even into the following spring. This is particularly true of some of the oaks. A fire will sometimes run through such brush and do an immense amount of damage. Such a fire is called a brush fire. It is carried along in part by the burning of the litter, but, wherever the opportunity offers, it runs up through the dried leaves remaining on the brush. In the eastern United States a brush fire is most likely to run during the late fall. Under ordinary circumstances, it has rather the character of a surface fire than that of a crown fire.

Fires running through young stands of conifers consume the foliage and readily kill the trees. In a very young stand, in which the trees stand isolated and the crowns have not yet grown to-

PLATE II

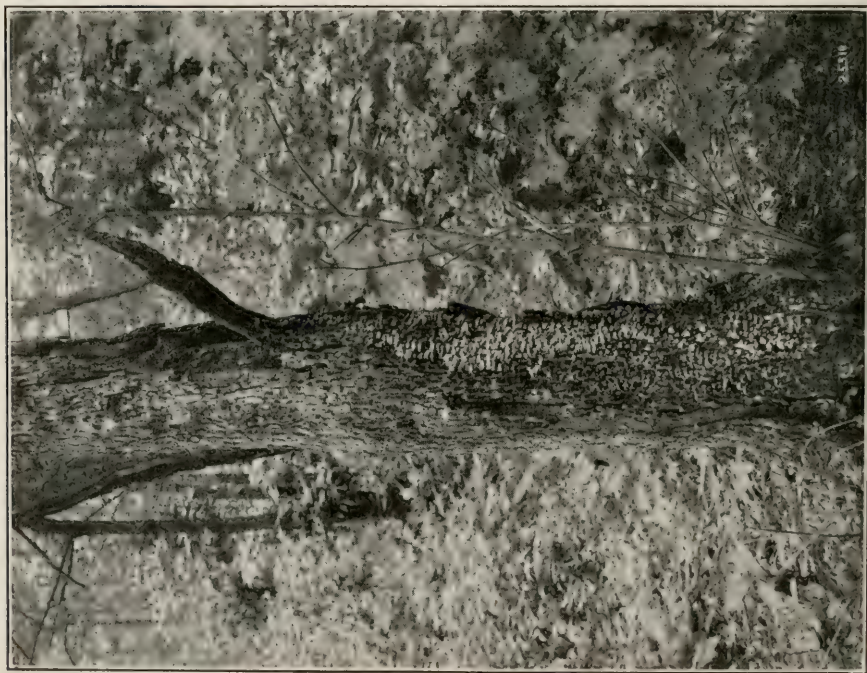


Fig. 1.—Fungus Attacking Tree Through Fire Scars

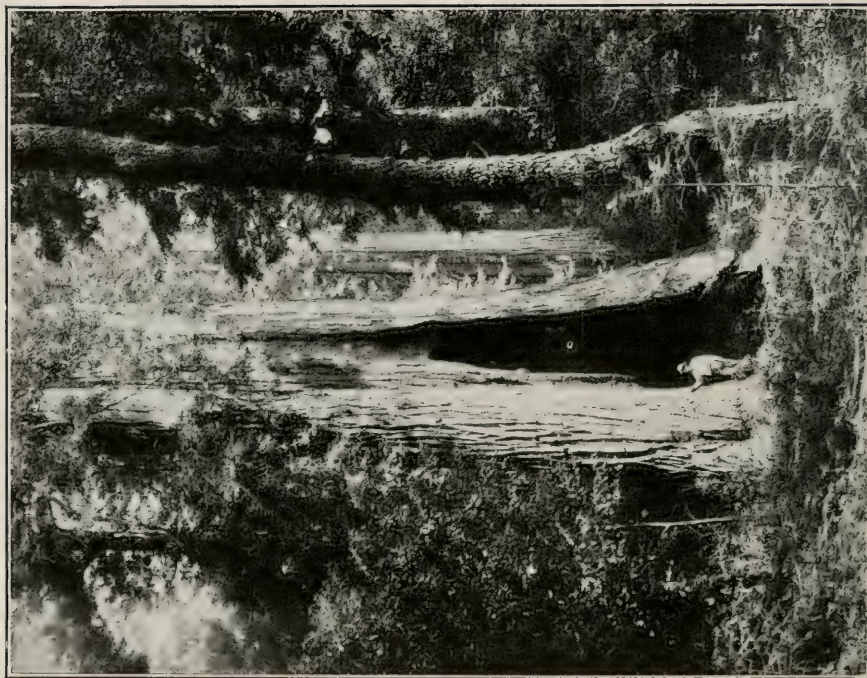


Fig. 2.—Hollow Tree, the Result of Fires

gether, the fire has the nature of a surface fire, intensified by the burning crowns. If the crowns meet, and there is a more or less complete canopy, a true crown fire is developed.

A special class of brush fires are those in the chaparral of the southwest. The brush is dense and there are many species with inflammable foliage. In many places a thick layer of litter and humus is formed on the ground, just as in a dense forest. Fires in this type of scrub forest are very fierce and destructive, and are analogous to fires in dense stands of young conifers.

GROUND FIRES

This term is applied to the slow fires that burn in the deep accumulations of vegetable matter common in many of our damp northern forests. Here the fallen leaves, needles, and other off-castings of the trees decompose very slowly, and a deep layer of partially decayed organic matter accumulates, often to a depth of from two to three feet. This material absorbs moisture with avidity and retains it tenaciously. Consequently, in most seasons it is not readily ignited. In some seasons, however, it becomes thoroughly dry and will burn. A fire in this peaty substance burns slowly, but with very intense heat, and is exceedingly difficult to extinguish. Ground fires in the Adirondacks have been known to burn all winter, creeping along under a deep layer of snow.

Ordinarily a ground fire will not cover more than a few acres in a day. Frequently, however, there is upon the surface a large amount of dry debris or small coniferous trees, so that there accompanies the ground fire a surface fire or a brush fire, or both, and occasionally a crown fire.

CROWN FIRES

Crown fires are those which burn through the crowns of the trees. (See Plate II.) They almost invariably start from surface fires. Occasionally, however, they are started when lightning

strikes and ignites a dry stub or resinous tree surrounded by a dense stand of conifers. If the crowns are of such a character that they will burn they may be easily ignited by the flames which rise from a surface fire. Sometimes a crown fire is started by the flames from a burning clump of young growth, and where the trees have exuded resin or there is loose inflammable bark, a crown fire may be started by the flame's running up the trunk.

Crown fires occur when the woods are very dry and when there is a high wind. Without a strong wind a crown fire is seldom started, and even if the crown of an individual tree is ignited, a fire does not usually spread and run through the crowns on a still day. Before a high-wind, a crown fire spreads with great velocity, taking at once a V-shaped form with a distinct front or head. This head may be only from fifty to 100 feet wide, but in the case of the largest fires its width may be very great. In the case of the larger fires the front is generally carried forward by a series of heads. The head of the fire burns very rapidly through the crowns, and there follows closely a surface fire burning with the same rapidity. There are well developed wings, where the fire runs through the crowns on each side of the head. These, in turn, are accompanied by surface fires, while spreading out on the skirts are wider surface fires, eating out diagonally with the wind and covering a broader area than the crown fire.

The strong draft of heated air arising from the fire carries up with it an immense quantity of burning cinders and pieces of bark. The wind, in turn, carries this material far in advance of the main fire head, and thus innumerable new surface fires are started. This gives rise to the popular idea of a spontaneous starting of fires in advance of a crown fire.

An ordinary crown fire does not run more than two or three miles an hour, although undoubtedly the great conflagrations of the north woods, such as the famous Hinckley fire in Minnesota in 1894, are swept along at a much

greater rate, particularly if the starting of new fires by burning cinders is taken into consideration. Even in extreme cases, however, it is questionable whether crown fires burn at a rate of more than from six to ten miles an hour.

The behavior of a crown fire depends on the character of the crowns. Crown fires are mainly confined to coniferous forests, for the leaves of hardwoods are not easily ignited.

They may, however, run through forests of mixed hardwoods and conifers, and in such cases the heat generated is so great that the hardwood leaves are scorched or killed. The velocity of the fire depends, further, on the density of the stand, the thickness of the crowns, and the force and steadiness of the wind. Other influences affect the severity of crown fires in much the same way as they affect that of surface fires.

DAMAGE BY FIRES

The damage done by forest fires may be discussed under the following heads:

- (1) Death of standing trees.
- (2) Injury to trees that are killed.
- (3) Injury to the soil.
- (4) Reduction of the rate of growth of the stand.
- (5) Effect of reproduction.

Death of Trees

Crown fires kill outright most of the trees in their paths. In a severe crown fire the foliage of coniferous trees is completely consumed. Hardwood trees in mixture are generally so badly scorched that the buds, leaves, and living tissues in other finer parts of the tree are killed, if not consumed, by the heat. Sometimes, however, where the fire burns somewhat irregularly—as, for example, where there are a good many hardwoods in mixture or the fire is broken by irregularities in topography—single trees or groups of trees often escape injury.

Ground fires, also, usually kill all trees in their way, for although they burn very slowly, they generate a great volume of heat and kill the living tis-

sues of the roots. Sometimes the injury is not apparent above ground, at all, but the trees die and after a time are blown over, because the roots have been killed and weakened.

Surface fires kill seedlings and young trees with tender bark, but in a great many cases do not kill outright the larger trees. Nevertheless, a very severe surface fire may kill everything in its path, and, not uncommonly, hardwood forests are entirely destroyed by fires which do not at any time assume the character and proportions of crown fires.

Some species have much greater power of resisting surface fire than have others. This is usually due to the character and thickness of the bark. Trees with delicate, thin bark are killed much more readily than those with thick, corky bark. Young trees are killed more readily than old ones, because the bark is thin and there has not been developed the layer of cork, which increases in amount with age. Accordingly, some trees which are very resistant to fire when mature are exceedingly sensitive when young. Good examples are the eastern and western white pines, the red pine, the western larch, and Douglas fir. The cork in the bark acts as a nonconductor and protects the living tissues from overheating.

Some species exude from the bark a great deal of resin, which catches fire and increases the intensity of the heat. A good example is lodgepole pine, which often exudes resin over a considerable portion of the trunk and increases the damage by fire. Other trees have soft, flaky bark, which catches fire readily. Like the resinous trees, these are killed at the point burned by the heat generated in this way. Shallow-rooted trees may be killed by surface fires when the heat of the burning humus is great enough to injure the insufficiently covered roots.

The living parts of a tree are more sensitive to intense heat at some periods of the year than at others. The most sensitive period is during the early part of the growing season, when active cell division is taking place and new cells

PLATE III

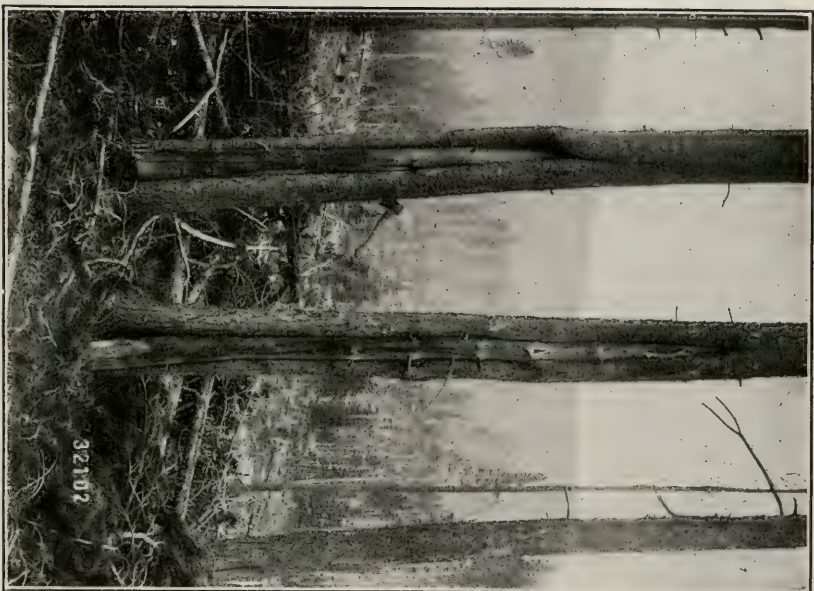


Fig. 1.—Lodgepole Pine Damaged by Fire

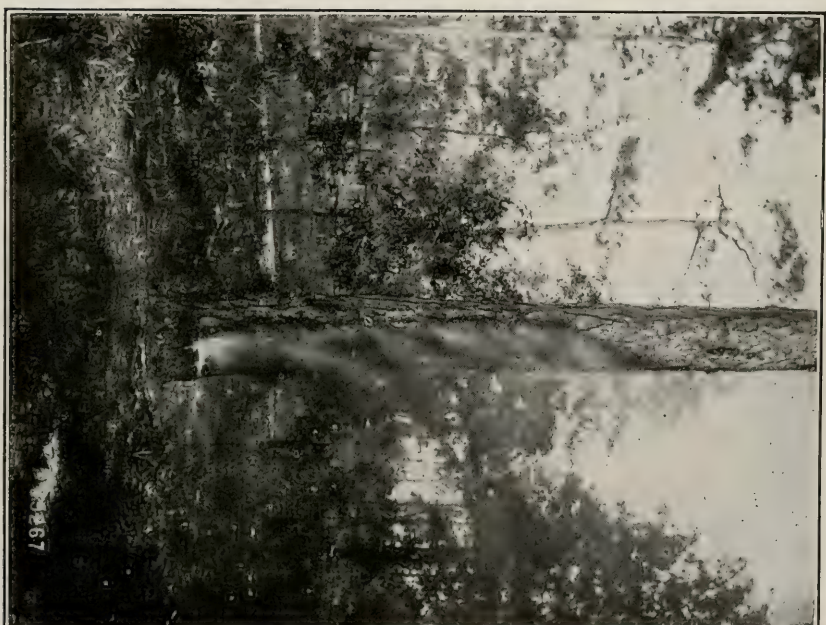


Fig. 2.—A Burning Turpentine Box—Longleaf Pine

are being formed, which are tender and naturally sensitive to abnormal conditions. This is very well shown by the damage of late spring fires. Thus, a surface fire in May or June may entirely kill hardwood trees which in the early fall would successfully resist a fire of equal severity.

Living tissue is killed when it is heated to fifty-four degrees Centigrade (129.2 degrees Fahrenheit).^{*} Very often the forester wishes to determine after a fire the extent of the injury. If the inner bark is brown or black, in contrast to the normal green color, this is an indication that the cambium is dead.

Injury to Trees

Many surface fires do not kill trees outright, but seriously injure them by killing a portion of the roots or trunks. It is very common to find, after a fire, that nearly all the trees in the forest have been killed on one side. (Pl. III, fig. 1.) This is usually the leeward side, because here the flames have an opportunity to burn in immediate contact with the tree long enough to injure it. If a fire is burning up a slope, even when there is no wind, the upper side of a tree is usually more damaged than the lower side, both because of the accumulation of leaves and other litter above the tree and because fires are carried upward by the currents of hot air, just as a fire on level ground is swept along by the wind.

In the case of a well-established tree, the killing of one side may not result in its death for a long period; and if the wound is not large it may heal over. Very commonly, however, the killing of one side of the tree induces the attack of some fungous disease, which ultimately results in the tree's death. (Pl. II, fig. 1.) Trees injured and weakened by fire are subject to the attack of insects. In many cases the death of trees after a burn is the result of insects' work and not of the killing of the tissues by the fire. Damage by fire often follows damage by insects. Thus, in

certain conifers insects injure the trunks, causing a local accumulation of pitch. A surface fire later burns the tree at this point and kills one side. The defect called "cat-face" is often caused in this way. Insect attacks, moreover, by increasing the number of dead trees in the forest, increase the fire danger.

In the case of large trees, which are very resistant to fire, a first fire may kill the tissues on one side, and subsequent fires may then burn into the dead wood until the trunk is nearly hollow. This result is very commonly seen in large white pines, that have a large proportion of the butt gouged out by repeated fires and are still alive. Many of the larger trees on the Pacific coast, like red fir, yellow pine, sugar pine, and big-tree, stand for many years after injury of this character.

The damage to a tree by killing a part of the trunk or a part of the roots depends on its resisting power and a variety of other circumstances. In some cases the tree is so weakened by the burning that it is afterward broken off at the butt. This is very common in longleaf pine forests, where old turpentine "boxes" burn out and weaken the tree. (Pl. III, fig. 2.)

The injury to the tree usually results in a reduced rate of growth. It is obvious that if a portion of the tree is killed the whole tree cannot perform its functions so effectively as before. The killing of a part of the crown, stem, or root system necessarily reduces the amount of nourishment which the tree can take in and furnish the growing parts.

It is not only in shortening life and in reducing growth that fires injure trees; the quality of the product is also affected. Even where there is no infection by insects or fungous disease, a fire that has killed one side of a tree usually leaves its scar. In time the wound may entirely heal over, but there is nearly always a point of weakness which may ultimately cause a seam or wind shake and unfit the butt log for lumber. If rot sets in, it may spread throughout the trunk and make the tree worthless, even if it does not kill it.

^{*}Der Waldbau, by Heinrich Mayr, p. 12

Injury to the Soil

A surface fire burns the dry leaves, and usually the humus which lies on the surface of the ground. If the trees are all killed by the fire, the crown cover, as well as the layer of litter and humus, is destroyed, and injury to the soil follows this exposure to the wind and sun. If the canopy is not seriously interrupted by the fire and only the surface litter and humus are burned, the extent of the soil injury from one burning is not serious. A very light surface fire that merely burns off the dry litter formed by one or two years' fall of leaves has little influence on the soil; and probably no single fire, even if it burned the entire humus and layer of litter, would so injure the soil as seriously to affect the growth of well-established trees. Normally in every forest a certain amount of humus is mixed with the mineral soil. This is of value, both physically and chemically. If a forest is burned over repeatedly, however, the humus in mixture gradually disappears, and since the leaves which fall are destroyed, and no new humus is formed, the soil is injured. While the soil loses its supply of nitrogen and the physical benefits of humus, the mineral ashes are not lost except as they are subsequently leached away. Nevertheless, repeated fires are very injurious to the forest.

Besides the direct injury to the soil through changes in its chemical content and physical quality, fires do further damage through opening the way to soil erosion. A leaf litter reinforces the forest canopy in protecting the soil against the impact of falling rain, and the network of roots which fill the ground hold the soil in place. The greater the humus content of the soil, the more absorptive the soil is. Fires leave the soil in condition to be easily borne away by running water, and increase the amount of water which runs over the surface instead of sinking in. If the slopes are steep and the soil easily borne away, erosion is sure to follow fires. In mountain country, if

the rainfall is heavy, thin soils may be so badly washed as to be no longer capable of supporting forest growth.

Reduction of Density

Most fires kill a certain number of trees, or injure them so that they either die or deteriorate in value before the forest can be cut. This is particularly the case with immature forests. The result is a reduction in the number of trees which will come to maturity, and hence reduction of the total increment and the final yield.

If a stand is mature and a part of the trees are injured or killed, it is sometimes possible to prevent loss by cutting directly after the fire. Often, however, it is not practicable to make a cutting in a given part of a forest just when desired.

When some of the trees in an immature stand are killed or injured there is always a loss. If the stand is cut, there is a loss through cutting trees which are in full productive growth. If the stand is allowed to grow, the final yield is reduced nearly in proportion to the reduction in the number of trees killed in the dominant or leading class.

An owner is often confronted with the problem of dealing with an immature stand in which a part of the trees—say thirty to sixty per cent—are killed or injured by fire. If the remaining trees are sound and thrifty, the best plan is usually to cut out the dead and damaged individuals, utilizing such as are marketable, and permit the remainder to mature, provided enough can be realized to cover substantially the cost of the work.

Effect on Reproduction

Reproduction in the forests of this country has been more influenced by fire than by any other one factor. The present composition, form, density, and yield of a great many stands are due to the influence of fires on reproduction.

Repeated fires prevent reproduction by destroying the seed and killing the seedlings. This is well illustrated in

certain areas of the south, where long-leaf pine is not reproducing itself—not because there is a lack of seed or because the conditions for germination are unfavorable, but because the annual fires kill the young trees.

Fires may influence reproduction through their effect on the soil and the soil cover. Frequently, after fires the ground is occupied by heavy brush or by grass, which impedes or in some cases prevents the reproduction of valuable trees. Many of the grass parks in the western mountains are the result of fire. A grass vegetation has replaced the forest. The running wild of burned areas to a heavy growth of brush is a common occurrence after fires in many of our eastern forests, as, for example, in Pennsylvania.

Forest fires modify the composition of stands. The opening up of a forest may so change the conditions of germination that some species cannot develop even when seed is abundantly supplied. This is in some cases due to the drying of the soil. A species which requires protection against drought in early youth might be excluded from

openings made by fire. In the same way the reproduction of a species sensitive to frost in early youth is often confined to areas protected by old trees.

Where the fire makes a large clearing, the succeeding forest usually differs in composition from the burned stand, except where there are only one or two species native to the region. The first species to spring up on the burn are those whose seed is readily and abundantly distributed to a distance from the seed trees. Thus, in the north woods of the east, birch and aspen are among the first species, because their seed is very light and is blown by the winds to great distances. Bird cherry comes up in abundance, because its seed is spread widely by the birds, and probably much of it is already in the ground before the fire. The trees with heavier seed creep in gradually after a few years.

Fires may kill certain non-resistant species, and thus stop their supply of seed. The tendency of repeated fires is to reduce the number of species in a stand.

(To be continued)



A FORESTER WHOSE FIELD IS THE CITY

By C. D. MELL

THE time is coming when the work of caring for trees in city parks and streets will call for men with a professional forester's training. Indeed, this time is already at hand. More big cities than one have foresters employed, and the work these foresters have to do can be effectively done only by men who have gone through a technical course of study such as prepares a man to handle trees in the mass for profit, instead of individually for ornament and recreation.

One of these cities is New York, where city forestry has been developed more extensively than anywhere else in the country. In the boroughs of Brooklyn and Queens there are 150,000 street trees, forty-one parks, and forty-five miles of parkways to look after, and a graduate of the Yale Forest School, Mr. J. J. Levison, formerly of the United States Forest Service, is in charge. Mr. Levison is also forester of the recently organized American Association for the Planting and Care of City Trees.

It would be a great mistake to suppose that the work of a city forester is simple, merely because he has to deal with single trees and not with whole forests. Assuredly, it is no simple matter to be responsible for the welfare of 150,000 separate and distinct trees, all of which are in plain sight all the time, and most of which some citizen takes an almost proprietary interest in. The tree that stands in front of the city man's gate is pretty nearly the only tree that he cares a rap about; but about that tree he cares at least several raps. He wants and expects it to be thrifty and slightly; he considers it distinctly

up to the man in charge to keep it so.

In the parks, again, a good many thousands of persons have a chance all the time to find fault with neglect of trees, when there is neglect; and if nobody has ground for complaint on this score, the reason is, whether appreciated or not, that the city forester is energetically holding down his job.

So if he is in earnest, the city forester's job will tax his lore and skill to the utmost. It is a new line of work, with big difficulties and a promising future. Mr. Levison was asked to outline for AMERICAN FORESTRY the work that falls to his share as city forester of Brooklyn and Queens. It was found that this outline skirted a wide and varied field.

THE CARE OF TREES

To begin with planting, the city forester, in addition to knowing the general principles of tree planting, must be familiar with the best methods for handling a much larger number of species than are ordinarily used in commercial planting, and understand how to adapt trees to a variety of local conditions that are not met with elsewhere. On account of the necessarily high cost of the work, as nearly as possible every planted tree must be made to grow. A nursery of 80,000 seedling trees is maintained for Brooklyn and Queens, and extensive experimental work is done toward solving special problems. One important branch of expert work is the transplanting of extra large trees.

In ordinary forestry, little pruning is done, even in Europe, on account of the cost; but in park and street work it is



Portion of the Spraying Outfit of the Park Department, Brooklyn, New York

essential. Scientific pruning calls for an intimate knowledge of the structure and life of a tree. The city forester not only supervises the city employees who prune trees, but regulates all pruning done by private persons.

Fighting the insects means knowing forest entomology and the use of insecticides, as well as practical experience with the best methods and apparatus. City trees have a vast number of insect enemies, and these cannot be exterminated merely by sprinkling the trees with chemical solutions. The city forester has to contend with epidemics of insects that cause wholesale destruction. The need and value of expert work has been shown by success with such epidemics in Brooklyn. Among other things, it was brought to light that a certain lead arsenate, extensively used in many eastern cities, was inef-

fective. A better one was found for exterminating leaf-eating insects.

Tree diseases have to be mastered, and this involves a knowledge of fungi and of their life-history. Again, cavities and wounds require special treatments, by means of which a forester may save considerable expense. Attacks of the hickory-bark beetle, the sycamore blight, the chestnut disease may become epidemic. Detecting them and suppressing them as promptly as possible requires constant close attention and the application, sometimes, of heroic methods. A very important field for scientific experiment is offered in connection with this work.

REMOVING TREES

Besides planting and tending trees, the city forester has to remove them.



Removing Egg Masses of the Tussock Moth Caterpillar in Brooklyn, New York



Decayed Tree Overthrown by the Wind in the Borough of Queens, New York

There are improvement thinnings to be made in the wooded areas of the parks, and dangerous and diseased trees must be taken out. In many cases special care and skill are needed to prevent injury to shrubbery or property. There are still some 3,000 dead trees standing on the streets of Brooklyn. Dangerous trees are removed within twenty-four hours after notification. What an emergency may call for is shown by the fact that during the severe storm of June 18, 1910, 300 trees were uprooted and made dangerous to life and property, and the task of clearing them from the streets in forty-eight hours devolved upon the city forester.

Trees in the forest do not have to be fertilized, because by the accumulation of humus they themselves keep storing up nitrogen in the soil. The nitrogen supply in the soil of an old forest may compare favorably with that in artificially fertilized agricultural soils, as Prof. Henry, of the French Forest School at Nancy, has shown. But city trees must sooner or later be fertilized;

the soil around them becomes impoverished in course of time, and nourishment must be supplied artificially.

The protection of trees from physical injury includes all sorts of mechanical devices, such as bars to prevent splitting, guards around the trunks, drainage and irrigation pipes, guards against electric wires, and other safety measures.

Supervising the work done by six or eight hundred men in the various parts of the city is a task that calls for good organization. Other supervisory work embraces a system of permits and inspection for regulating the planting and care of trees by private persons; the establishment and enforcement of rules for house moving and street grading where trees are apt to be interfered with; preventing injury by telephone and other electric wire companies, by steam engines placed under trees, by advertising signs, by guy-ropes attached to trees, etc. Not only must the men be well organized for this work, with the proper man in the proper place, but

the work must be carefully checked up. The forester must, moreover, strive to train his men by practical illustrations, lectures, pamphlets and field instruction.

Over 25,000 requests for attention from individual citizens have been received in Mr. Levison's office in the last three years. These called for advice on all sorts of tree problems, and it was the task of the forester to train men to answer the less important questions and to look personally into the others. The information given ranges from identifying tree species, insects, and diseases, to advising on treatment, planting, and other operations. It is furnished for use on home grounds as well as for public trees. Frequently advice is given even to non-residents, by mail.

A map in the city forester's office shows the location and condition of every street tree. Other necessary records include tree maps of the parks, 2,000 photographs, statistics of conditions, a record of the treatment applied to every tree that has been brought to the attention of the department, reports, and similar details.

PROMOTING PUBLIC INTEREST

Lectures are given before organizations; before the people, under the

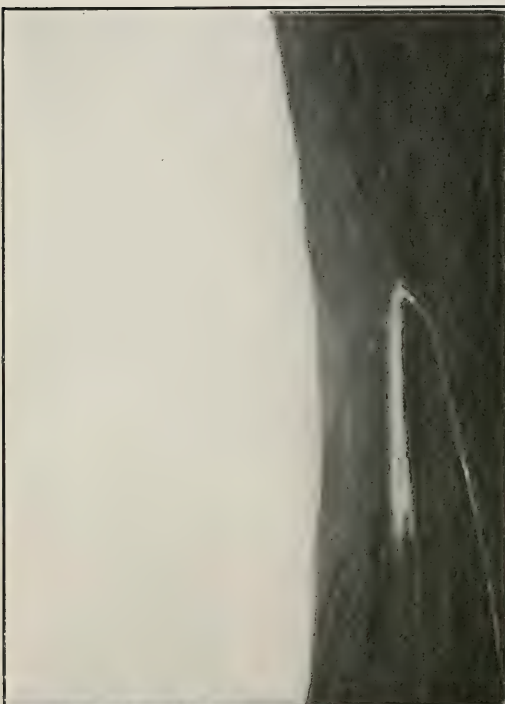
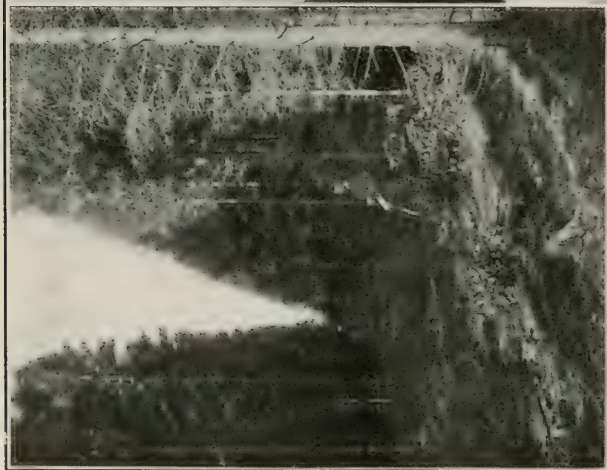
auspices of the board of education; before civic bodies in New York and other cities; before scientific bodies and courses for teachers, and at local scientific institutions. Over a hundred lectures of this character have been given in the last four years.

Articles are prepared for gardening, scientific, and popular magazines, for newspapers, museum journals, and school publications. More than forty such articles have been written, and 150 interviews have been given out.

Other educational work includes teaching both children and adults by means of labels placed on the trees in the parks; through addresses, messages, and celebrations on Arbor Day; by the publication of tree guides, and by the formation of tree clubs. Special tree labels were prepared and posted for the Hudson-Fulton celebration last summer.

The widespread educational effects of good work in caring for city trees will extend, necessarily, beyond the city limits and rouse an interest in economic forestry, the aim of which is strictly practical. For this reason the city forester's task is more than the creation of beauty. But it is through the beauty he achieves that the charm of the forest is made to lay a firmer hold on urban life. His work is, therefore, of far-reaching civic value.





REFORESTATION IN DENMARK

On the right—The heath before it has been made productive.

On the left—A forest grown on the heath.

Below—Forest and pasture supplanting the heath.

THE REFORESTATION OF DENMARK

By WILLIAM HOVGAARD

THE peninsula of Jutland forms the continental part of Denmark. It was in old days covered with primeval forests, but these were gradually destroyed, especially in the central and western portions of the peninsula, where the soil is extremely poor; so that by about the year 1500 this part of the country had been largely transformed into a barren, black heath and sand dunes. The population had itself caused the destruction of the forests by a most reckless treatment of them, not comprehending that the presence of the forests was the main condition for the existence of human life in these parts of the country.

The climate, which had formerly been damp and mild, now became dry and harsh, and by the middle of last century a scant population was left settled on the long and narrow meadows along the water courses, which cut through the heath. These meadows were, however, gradually being transformed into heath, because the water courses cut themselves deeper into the bottom of the valleys, whereby the water level was lowered. Even on the east coast of the peninsula and on the Danish Islands, where the soil is richer, the forests had deteriorated to such an extent that in the eighteenth century there was a serious danger of their total disappearance. In the last half of that century, however, an awakening took place, and in 1805 an act for the preservation of forests was passed, whereby most of the forests then existing were saved. During the same period, that is, from about 1750, efforts were made to plant new forests on the heath, and during the following 100 years many attempts were made in this direction, largely with the support of the government; but the results were anything but encouraging.

It was generally found that, after a few years' growth, a stagnation would set in, and only in localities where the soil was richer would the trees grow up. Thus by the year 1866 but very small areas had been successfully planted, and while the east coast of Jutland was covered with woods and with fields of rye, wheat, oats, and barley, the western and central portion was covered with the dark heather as far as the eye could see. Here and there small groups of scrub oak would be found, remnants of former beautiful forests, crouched close to the ground under the influence of the strong westerly winds. In fact, one-fifth of the entire area of the kingdom was in a desert condition, and a still larger area was but very imperfectly utilized.

The many failures in planting and cultivating the heath had given to most people the conviction that it was hopeless to spend more energy and money on this problem. It was at this point that the cause was taken up by Col. E. Dalgas, an engineer officer of the Danish army.

Dalgas was a man of rare energy and ability and of great patriotic enthusiasm; it was plain to him that many dark points in the problem had to be cleared up before it could be technically solved, and many difficulties had to be overcome, among which perhaps the most formidable was the prevailing lack of understanding and faith in the cause. He saw that the work could not be started on the ground of immediate or direct financial return, and that it was necessary to appeal to the patriotism of his countrymen.

It was in one sense an auspicious moment for such a movement. In the unfortunate war of 1864 Denmark had lost the Schleswig-Holstein provinces,

and a general feeling of depression and discouragement prevailed. An idea, like the reforestation of the country by which large areas of land could be reclaimed, compensating in some measure for the lost provinces, would naturally appeal to the energetic and active elements of the population. No man was probably better fitted for this work than Dalgas. He soon succeeded in rousing interest in the cause, formed in 1866 the Danish Heath Society (Det Danske Hedeselskab), and found many warm supporters of his work, prominent among whom was the Danish consul-general in Hamborg, Pontoppidan, who enabled Dalgas to commence the work. Also, the government was induced to give a subsidy, which at first was small, but which in the following years was increased and was supplemented by increasing private subscriptions.

The first technical difficulty to be solved was that of finding a tree which would grow under the adverse conditions existing on the sand dunes and on the heath, and it was found that the mountain fir from Central Europe (*Pinus montana*) served the purpose better than any other tree. This tree would, in fact, thrive in spite of winds and drought, wet or cold, and would kill the heather by spreading close over the ground. Spruce, if planted alone, would generally reach a certain development, but then stagnation might set in and continue for many years; only in some spots would the trees grow up, where they appeared as hillocks or islands above the average growth of stunted and undeveloped trees.

The cause of this irregularity in the growth of spruce was sought in local conditions of the soil, but in many such cases the most scientific research has not revealed any difference in the physical or chemical composition of the soil, and it is now generally considered that the cause is biological.

The next great step in the development was the discovery of the remarkable fact that the mountain fir acted as a nurse to spruce trees planted in its vicinity. In the same localities where spruce, if planted alone, would remain

stagnant at an early age, it would, if planted close to a mountain fir, grow up vigorously; and on the basis of this discovery a new system of planting was introduced, by which the mountain fir and the spruce were mixed, one mountain fir for each one, two, or more spruce trees, according to the quality of the soil.

After some years of experience it was, however, found that the mountain fir, which had been an excellent nurse during the early years of the life of the spruce, would hamper their growth and cause them to stagnate when they were at the age of about ten years; while the mountain fir would grow up and overshadow the spruce. Now followed the next important step in the development, when it was discovered that even if the mountain fir was cut down at an early age, the vitality which it had given to the adjacent spruce trees would remain in effect, and these would continue to grow thereafter as well as if they had been planted in good soil.

This remarkable discovery was made by Colonel Dalgas's son, Christian Dalgas, who is a forester in the service of the Heath Society, and one of its leading men, and who has devoted his life to the continuation of the great work commenced by his father.

The influence of the mountain fir on the spruce was for a long time denied by many men of science. The phenomenon is not clearly understood, but various theories have been propounded, the most plausible of which seems to be that the roots of the mountain fir are inhabited by some microscopic parasite, which produces the nitrogen necessary for the growth of the trees, and that this organism is transferred to the roots of the surrounding spruce trees. Once this infection or transfer has taken place, the presence of the mountain fir is no longer necessary, and is, in fact, rather pernicious after the trees have reached a certain age.

Hence, by the latest method of planting, mountain fir and spruce alternate, so that one mountain fir is planted for each one or two spruce trees, and at an early age the fir, when it has done its



Planted spruce, with fir nurse trees removed



Planted spruce overtopped by fir nurse trees

work of starting the spruce, is cut down. The material obtained by cutting down the young fir is used as fence sticks, or it is utilized for burning charcoal and for making tar.

The spruces mostly used are white spruce (*Picea alba*) and red spruce (*Picea excelsa*). The former, which comes from North America, is particularly well suited for use in those parts of the plantations most exposed to the wind; in fact, it seems to stand the wind better than any other tree. White spruce is therefore used in conjunction with mountain fir to form the first sheltering windbrake, and behind such belts the red spruce is planted together with the mountain fir. The mountain fir mostly used is *Pinus montana uncinata*.

In the shelter of and surrounded by the forests, deciduous trees are planted and potatoes and other crops are raised. Live fences of fir and spruce are planted about 120 yards apart, running north and south, so as to provide shelter against the prevailing westerly winds. The soil is ploughed and treated with the proper fertilizers. In this way excellent and profitable results have been attained even in the poorest soil. Not only has the presence of the forests made the climatic conditions more favorable for agriculture, but the entire character of the country has changed. In the large forests deer are found in abundance, and wood pigeons, ducks, and many other wild birds have settled in them.

The activity of the Heath Society is also directed toward the planting of the sand dunes which cover large areas along the coasts of Jutland; great works of irrigation and drainage are undertaken and the numerous and extensive bogs have been brought under cultivation. A chalky clay called "mergel," which is found in spots all over the peninsula, is spread over the bog, the water is drained off, and the soil so prepared, with but little additional treatment, is well suited for pastures. In this way useless bogs have in a few years been transformed into the richest pastures.

Already more than 100 Danish square miles (2,500 English square miles), or about one-seventh of the entire area of the kingdom, has one way or the other been reclaimed since the Heath Society commenced its work, and in one more generation the heath will probably have entirely disappeared. A movement is in fact already on foot to preserve a certain part of the heath as a sample of what has been for centuries a characteristic feature of the country.

The growing interest for this cause is evidenced by the increasing means placed at the disposal of the society. The subvention of the government has now reached an amount of \$130,000 a year, and about an equal amount is derived from private donations. The peasants and farmers are intensely interested in this cause, and most farms, even in the poorest part of the country, are now surrounded by trees. Often larger groups of trees or small woods have been planted by the peasants or farmers and are regarded by them as their dearest treasure.

At a very moderate expense, land can be bought on the heath through the Heath Society, which at a very cheap rate undertakes planting the trees and their care, including the cutting down in due time of the mountain fir.

Large purchases of land have been made by private people in this way, chiefly on patriotic grounds, but in course of time this land and the forests which are planted on it are likely to acquire considerable value, for with the growth of the forests and the increased cultivation of the soil, the density of the population increases rapidly, and the means of transportation are steadily improved. A town like Herning, which lies in the middle of the heath district, and which in 1866 had but forty inhabitants, now has 5,000 inhabitants.

Some years ago a caterpillar (*Lo-phyrus pini*) appeared, and made great devastations in the plantations. Many people predicted the entire destruction of all the fir and spruce plantations; but the Heath Society did not lose courage, and proceeded to fight the pest. Soon a parasite was found, a wasp

which laid its eggs in the caterpillar, and after nine years the pest almost disappeared.

The experiences and discoveries of the Heath Society have been made fruitful also on the Danish Islands, and have been applied in neighboring countries; in fact, Germans, Swedes, Norwegians, and Finns have all studied and applied the methods developed by the society.

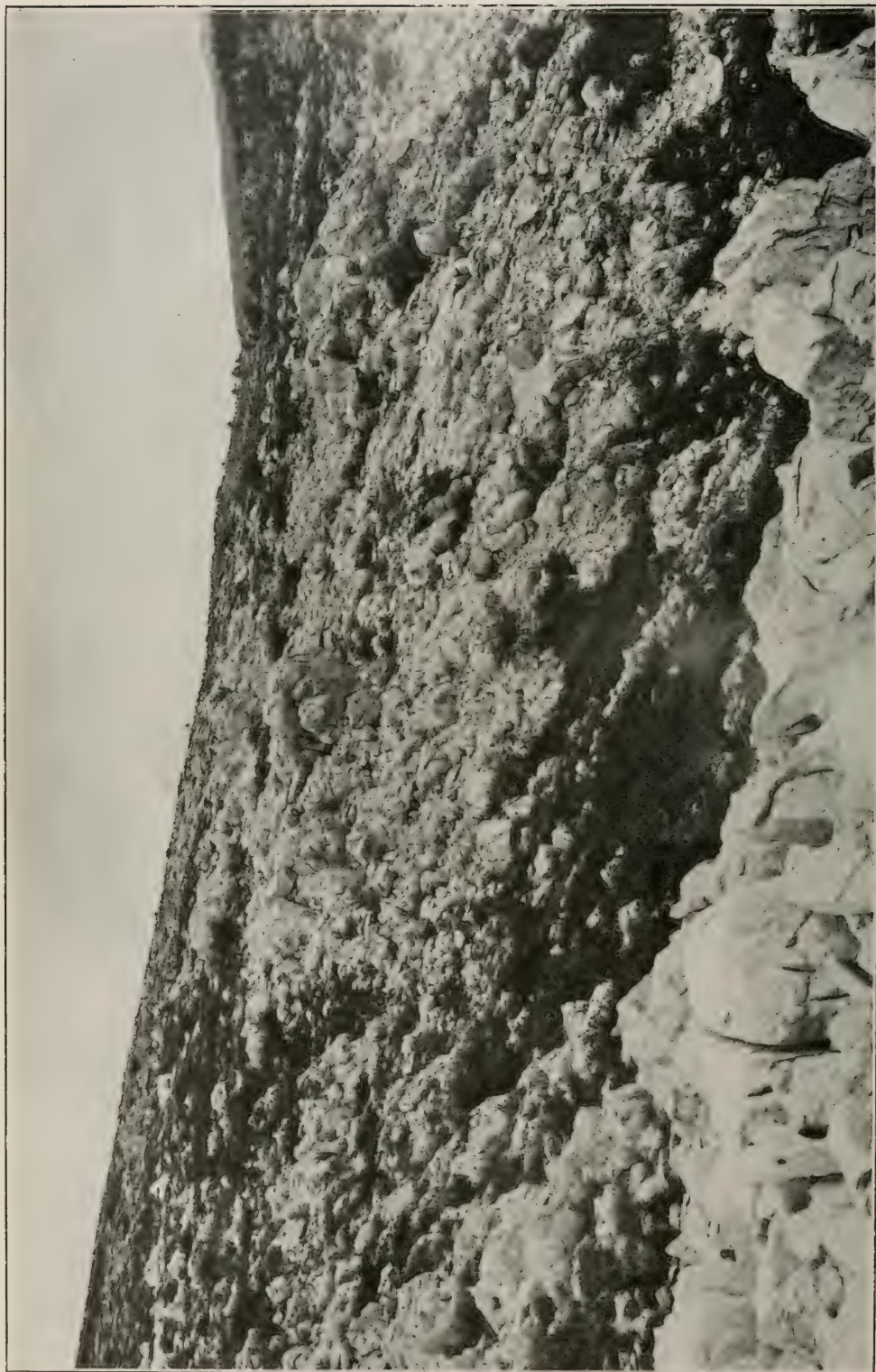
An interesting experiment has been made in connection with this work by employing in the cultivation of the heath prisoners from the state penitentiary for hard labor. About ten years ago, during the summer, a small number of prisoners were taken out to an isolated part of the heath in the middle of Jutland, at a place called Gedhus, and were there employed in all the various work connected with the preparation of the soil and the planting of the trees, under the supervision of two prison officials. Difficulties of various kinds had been anticipated, and many people were strongly opposed to the experiment, but it proved a complete success. Every year an increasing number of prisoners has been employed on the heath. The behavior of the prisoners has been perfect; they have enjoyed their work, the relative freedom and the life in the open air, and they

have had the great satisfaction of seeing the results of their work growing from year to year. Work on the heath has, in fact, always been considered by the prisoners a great privilege, and is granted only to those who stand highest in point of behavior. There are now some forty or fifty prisoners employed every summer on the heath, and a considerable amount of work has already been done this way.

The foregoing brief and imperfect sketch is a summary of the information and impressions obtained by the author during a visit to the Jutland heath and its plantations last summer; it is written for the purpose of drawing the attention of people in the United States to the work done and the methods applied in a country which has already gone through all the phases; abundance of primeval forests, deforestation, and the preservation and planting of forests.

The United States stands at present in the midst of the second stage, the deforestation, which is proceeding at an alarming rate; it may, therefore, be well for people of this country to turn their eyes to Denmark, where, at any rate, the natural difficulties to be overcome in point of climate and quality of soil far exceed those confronting the forester in the United States.





THE KARST, AUSTRIA

What the region looked like before reforestation

THE KARST; REFORESTED WITH AUSTRIAN PINE



WHAT THE KARST PICTURES TELL

SEVEN hundred years ago the police regulations of Triest forbade, under strict penalties, the felling or trimming of trees, the setting of fires, and the herding of stock in the country round about. Fifty years ago there was no forest on the land concerning which these regulations had been issued; no pasture; nothing to burn, even if the setting of fires had been attempted. In the interim the place had been laid waste. The regulations had been forgotten, superseded, or disobeyed, and the region known as the Karst, consisting of barren limestone without useful vegetative cover of any sort, presented a land prob-

lem which staggered the economists. Some 600,000 acres of profitless barrens were all that was left where for ages productive forests of conifers and hardwoods had once supplied ship timbers and other wood for the use of the Venetians. To-day, by forest planting, supplemented by protective measures where the ruin was less complete, about 400,000 acres of this waste have once more been brought into productive condition. Indirect benefits also have accompanied the restoration of the forest. Amelioration of the local climate has made possible the successful pursuit of agriculture on the adjacent tillable soils.

THE STORY OF MANTI

A Study in Cause and Effect

By WILL C. BARNES

HARDLY had the early Mormon pioneers established themselves in their city on the shores of the Great Salt Lake, when their leaders began pushing out exploring parties, with a view to spying out the land about them and locating smaller colonies of saints wherever the conditions seemed satisfactory.

With them, possession was the necessary nine points, and they could say to new comers not of their faith: "It's ours. We saw it first; please keep off the grass."

Eventually, the farsightedness of those men who were then at the head of the Mormon church was fully justified. By the time the rest of the west awoke to the fact that Utah was something besides a desert of sage and alkali, these industrious people had practically covered every available location in the state and, incidentally, had flowed over into a goodly slice of Idaho and northern Arizona.

Like the old Spanish conquistadores, these churchly pioneers carried in one hand the insignia of their faith, but in the other, instead of the sword, they held the irrigator's shovel—a much more peaceful and civilizing weapon. Down in the Wasatch Mountains in southern Utah, a small exploring band of these disciples of the Church of Jesus Christ of Latter-day Saints found a lovely valley, lying close under the great mountain range, where a rollicky little stream came dancing out of the hills. Wherever those Mormons found land and water lying in close proximity one to the other, there they located a colony and proceeded to wed these two resources, whose offspring are homes and prosperity.

The arable land lay right at the mouth of a great canyon, which wormed its way back into the dark forest-covered sides of the mountain. Here they laid out a town, broad as to streets, the lots measured by acres instead of feet, and in the center a "stake" house, such as all well regulated Mormon communities build almost the first thing.

They named the place "Manti" in honor of one of the ancient cities mentioned in the Book of Mormon. About the town lay the land—some 6,000 acres in extent—upon which, through irrigating ditches, the settlers carried the water from the creek, while beyond this was one of the best grazing areas in all the west. There seemed no limit to the grass and forage in the mountains. As they prospered, their herds swarmed over the range; they followed the snow as it melted in the warm spring sun when the ground was still wet and soft. They climbed to the very tops of the peaks with their sheep in search of feed, and there they stayed until the snows drove them out in the fall into the winter ranges.

Other herds than those belonging to Manti were driven from distant points to summer in these splendid pastures, and the stockmen were soon fighting for the ranges like wolves about a carcass. The feed was eaten off by their hungry animals as fast as it grew, until the whole area was swept bare of all its former cover of grass, weeds, and brush, as if a fire had passed over it. Finally, the Wasatch Mountains were but a "bed ground" for the stockmen's herds.

This was the condition when, in 1903, the government agents went into that region for the purpose of seeing what



MANTI, UTAH

A street after the flood of August 29, 1901

could be done to protect the forests in the mountains from fire and spoliation.

For several years previous to their coming, the little city of Manti had been devastated by floods that came rolling down the canyon from the mountains about them. These floods swept away whole farms, spread sand and silt over acres of fine farming lands, and deposited in the streets great masses of rocks and boulders. Families were ruined, and the value of property greatly depreciated. Many, believing the city doomed, moved away. The citizens fought these floods to the best of their ability and built huge dykes above the city in hopes they would turn the waters and keep them in the bed of the stream.

But all their work was in vain, for the dykes were swept away as are the sand forts built by the children on the seashore. Then they set about remedying the matter by looking for the cause of the floods. It was not a question of timber cutting, for while some timber had been cut from about the heads of the canyons, not enough had been taken to account for the floods.

The older settlers knew that when they first came to Manti, the hills and mountains round about were covered with a dense growth of grass, weeds, and shrubbery. Added to this there was a deep cover of humus, composed for the most part of decayed leaves, pine needles, and such matter. Into this cover the snows of winter and the rains of summer had soaked, to find their way, slowly and without erosive action, to the valleys below.

Then came the herds of sheep and cattle, and the hills were swept bare. The snow and rain fell upon a soil trampled by the stock until it was packed so hard that the water ran off it as from a roof. The ground cover, which once held the waters, was gone. And what the stock didn't do to make this destruction complete the fires did.

Then followed the floods.

Every one agreed as to the cause; the remedy was simple. They asked the government to set aside the mountains about them for a national forest and, when that was done, to prohibit the grazing of all stock upon the Manti watershed.

This was carried out, and the results were marvelous. The grasses soon came back; the weeds and underbrush again covered the ground, and, as fires were kept out, the barren, over-grazed areas began to resume their original appearance. The falling leaves and other decaying vegetation once more began to cover the bare ground, with its soft, spongelike humus, and Dame Nature has done her best to erase the scars due to man's stupidity and shortsightedness.

The floods, too, began to be less frequent and less severe, and for the last three years the little city of Manti has almost forgotten that there ever were any troubles over floods.

During the month of August, 1909, there was an unusual amount of rainfall in the area covered by the Manti forest. This was uniform all over the region, and from each canyon on the eastern slope of the range came heavy floods.

On the western slopes the same conditions prevailed and damaging floods swept down every canyon but that of Manti. The floods in the Ephraim Canyon, which lies immediately north of the Manti Canyon, did a great amount of damage to the little city of Ephraim, covering its fields and the streets of the town with a heavy deposit of mud, rocks, and driftwood. All these canyons on both sides of the range head in approximately the same region; all received apparently an equal amount of rainfall; yet the Manti Canyon alone was free from damaging floods.

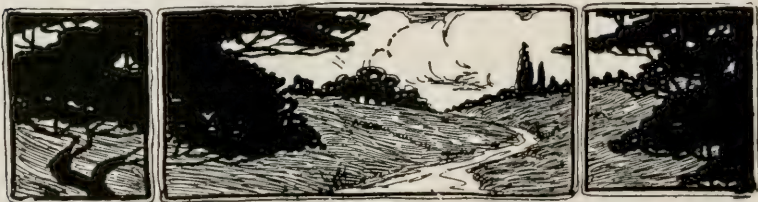
The settlers living in the flooded regions are unanimous as to the reasons why they suffer from these annual flood troubles, whereas the Manti people do not, and they are now asking for similar protection to their watershed.

Then some stockmen from another section, seeing the feed on this watershed uneaten and, in their greedy eyes, going to waste, coveted it. They appealed to the Forester to allow them to graze their stock upon the proscribed area.

This appeal was as a trumpet call to the men of Manti. Almost as one, they begged the government not to allow any grazing upon their watershed. They pointed to the old conditions which existed before the mountains were set aside as a forest, and then to the present conditions, as full justification for the restriction. They urged that the prosperity of their community of more than 3,000 people was of far more value to the state of Utah than was the feed which the stockmen desired.

Nor did their pleading fall upon deaf ears. The request of the stockmen was refused. And, doubtless, just as long as the safety of the Manti fields depend upon the protection of these hills, so long will all stock be denied the privilege of grazing over them.

There are some who affect to scoff at these facts, but if they will go to Manti and study them they will find it hard work to convince those Manti farmers that the removal of the protective soil cover on their watershed had nothing whatever to do with the floods.



KNOWN BY THEIR FRUITS

The Ninth Annual Meeting of the Society for the Protection of New Hampshire Forests

By EDWIN A. START

NO STATE in so short a time has accomplished more in forestry than has New Hampshire in the last two years. A short time ago the Granite state was very backward for one with such extensive forest interests, but now it has taken a place in the front rank. This gave especial interest to the ninth annual meeting of the Society for the Protection of New Hampshire Forests, for it is largely through the unselfish and untiring efforts of this organization that the good results have been brought about.

The meeting was held on the 2d and 3d of August, in the Mount Washington at Bretton Woods, in the heart of the White Mountains, and among those present were many men prominent in New Hampshire affairs, and many members of the society from outside the state, for this organization draws much of its support from other states, so widespread and strong is the love of the New Hampshire hills and the forests that clothe them.

An interesting phase of the new order is the close cooperation between the society and the forestry commission of the state. The personal and selfish politics which for many years interfered with the efficiency of the commission have been done away with, and that body has become a clean-handed, clear-headed, vital force in developing the great forest interests of the state. At present it is headed by Robert P. Bass, of Peterborough, who has been an active agent in the work of reorganization from its beginning. As a member of the last

state senate, he did great service in securing the legislation which has put New Hampshire on its feet. He is now a prominent candidate for the Republican nomination for governor. Last January he was made a director of the American Forestry Association. With him are associated W. R. Brown, of Berlin, who represents one of the largest lumber interests of the state, and Gen. J. E. Tolles, of Nashua.

An indication of the new harmony between the commission and the society was to be found in the program for the first session of the Bretton Woods meeting. This was a meeting of town forest fire wardens of New Hampshire, under the auspices of the state forestry commission, Hon. Robert P. Bass presiding. Several of the wardens attended, all sections of the state being represented, and there was a live and intelligent discussion of methods of fighting forest fires and of the legal responsibilities of the wardens. F. W. Rane, state forester of Massachusetts, and C. R. Pettis, superintendent of state forests of New York, contributed to the discussion accounts of the fire laws and their administration in their states.

The second session, Tuesday evening, at which Hon. Frank W. Rollins, president of the society, presided, opened with an illustrated lecture by C. R. Pettis on forest planting. Mr. Pettis in his service for the state of New York, has probably done more actual forest planting than any other forester in this country, so that his description of this work and its conditions was of espe-

cial value and interest. After the lecture there were speeches by Governor Henry B. Quimby, Senator Henry E. Burnham, and ex-Senator W. E. Chandler.

Wednesday morning there was a talk by the state forester of New Hampshire, Edgar C. Hirst, which was really a report of progress. Its main features are therefore especially well worth summarizing here. The new forestry law of the state provides for a forestry commission and for a state forester, whose duty it is, under the direction of the commission, to have charge of all forest fire wardens in the state, and to aid and direct them in their duties. He is also to give educational lectures throughout the state, and, whenever he deems it essential to the best interests of the state, to cooperate with counties, towns, corporations, and individuals in preparing plans for the protection and extension of the forests. It provides for the appointment of a forest fire warden in each town, whose duty it is to extinguish fires when they occur, in doing which he may require the assistance of persons and the use of property. The expense of fire fighting is then shared equally by the town and the state. It is the warden's duty also to keep the town posted with fire notices and persons desiring to burn brush must in times of drought first obtain the warden's permission. Further provisions of the law prohibit the careless setting of fires and provide penalties for violations.

By the enactment of this law, which took effect May 1, 1909, the state of New Hampshire made a long forward step in its forest policy. Under this law, the forestry commission has endeavored to get the best results with the funds appropriated, and has been able to increase the scope of its work by cooperating with private individuals interested in forest preservation.

On July 1, 1909, a state forester was appointed and the first work begun was the appointment of forest fire wardens. It soon became evident that this would require considerable time, and, as fires were occurring in different parts of the

state, the wardens who had held office under the old law were asked to hold over until new appointments could be made. In this way other lines of work could be pursued and better men were secured as wardens than if the appointments had been made with undue haste. This method has been fully justified by the results. The state has a corps of wardens who are experienced fire fighters, interested in their work and prompt to act. They have posted about 10,000 cloth fire notices, have notified owners of portable sawmills about the use of spark arresters, and have prevented many fires by warning persons about the danger of burning brush in dry weather. In general, the law has worked well, and with a few minor changes will be a very effective law for the southern and central parts of the state.

The commission realizes that this system is not adequate to protect the wild mountain forest, and there is not enough appropriated by the state for this purpose. However, contributions from private parties have permitted the building of several mountain lookout stations, to be connected by telephone and used for fire patrol. Also several mountains are used where telephone lines have already been built. The mountains being used are: Magalloway, south of the Connecticut lakes; Signal Mountain, in Millsfield; Black Mountain, in Cambridge; Sugar Loaf, in Stratford; Pine Mountain, in Gorham; Mount Madison; Mount Agassiz; Mount Moosilauke; Mount Rosebrook; Mount Osceola; Mount Kearsarge; Mount Carrigain; Croydon Mountain. The value of these stations has already been proved by the quick discovery and extinguishing of fires that otherwise might have caused considerable damage and expense. Seven more stations, or twenty in all, would cover about all the wild land and make a very effective fire protection system for the mountain region.

Beside the administration of the fire law, and the work of cooperative protection, the forestry commission has been aiding private owners in the practice of forestry. Numerous applications

have been received for assistance and advice in handling woodland, but the forester has been able to visit only a few of the applicants. In some cases, a preliminary examination has been made and further investigations, plans for cutting, planting, and so on, have been carried out under the direction of the forester by a woodsman paid by the land owners.

As many applications were received from persons desiring to plant pines, an agreement was made with a nurseryman to furnish two-year-old seedlings at three to four dollars per thousand, according to the number purchased. The commission and the forester have started a private nursery in order to have thrifty transplanted stock on hand for those who wish to make a beginning in forest planting. It is hoped that an appropriation may be secured for a state nursery, so that this work may be largely extended.

Educational work has also been a feature of the commission's activities. During the past year the forester has made some thirty addresses and talks before boards of trade, granges, and various organizations. He also gave a course of lectures at the State College on the practicability of forestry in the pine, hardwood, and spruce lands of the state.

Mr. Hirst pointed out the following immediate needs, most of which require some legislative action:

1. *Forest Organization Districts.*—The state should be divided into four or five districts, according to watersheds, and a chief appointed for each district. Under this chief an efficient fire service could be built up, with firewarrants, deputies, patrolmen, and so on.

2. *Lookout Stations.*—Stations already established should be taken over by the state, and enough more established to cover all the wild land. Good maps should be made to supplement the lookout work, and these should show all topographic features and the trails, logging roads, and all natural fire barriers, also the location of storehouses containing fire-fighting tools and provisions.

3. *Railroad Fires.*—The railroads should use oil-burning engines in dry seasons, or should use spark-arresters approved by the forestry commission; build fire lines along the right of way, and maintain patrols when

the commission thinks it necessary. At present, there is no law requiring even the use of a spark-arrester.

4. *Brush Disposal.*—There should be a law similar to that of New York, requiring the lopping of branches from the tops of soft-wood trees when logging operations are in progress.

5. *Minor Changes in the Law.*—(a) The dates between which brush cannot be burned without a permit should be fixed by law. (b) Provisions for the payment of fire bills should be simpler, so that both bills and reports can be acted on promptly. (c) There should be a provision whereby a hunter who is careless with fire should lose his license.

6. *Stricter Enforcement of the Law.*—This will come as people become accustomed to the law. Nevertheless, prosecutions against offending parties should be pushed.

7. *A State Nursery.*—An appropriation is needed for a nursery that can furnish especially strong stock for those who are making a beginning of planting, and larger quantities of seedlings to others.

8. *State Cooperation with Private Owners.*—The department should be enlarged so that all who apply for assistance can get it. Some plan of state cooperation in planting cut-over and waste lands should be provided.

9. *More Educational Work.*—Bulletins on white pine and other profitable forestry trees should be issued as soon as there is a demand for such information. Bulletins should be issued to school children on various forestry matters, especially explaining the danger from the careless use of fire. Fire notices and fire laws should be printed in different languages, to make the foreign population more careful about fire. Exhibits at fairs should be made often, and the lecture work of the department should be extended.

10. *State Forests.*—The state should at once begin the purchase of small demonstration forests, and later should acquire some revenue forests.

Following Mr. Hirst's presentation of the work and needs of the state forest service, the reports of the treasurer of the society, Gen. George T. Cruft, and of the forester were presented. The former showed a successful year financially and indicated the growing strength of the society. A great deal of this was due, it was pointed out, to the work of the chairman of the finance committee, Montgomery Rollins. The forester, Philip W. Ayres, reviewed the work of the society for the year, and especially what had been done and had failed to be done in connection with the Appalachian forests bill. The Senate filibuster was examined, with especial reference to the peculiarly malevolent at-

titude of Senator Burton of Ohio, and Mr. Ayres expressed himself somewhat pessimistically in regard to the prospect of the passage of the bill by the present Congress.

Addresses by the Hon. Frank D. Currier of New Hampshire and the Hon. A. J. Peters of Massachusetts dealt in detail with the same subject. Mr. Currier showed himself as graphic a narrator as he is a skilled parliamentarian, and his story of the strenuous fight for the Weeks bill in the House held the close attention of an interested audience and put his hearers in possession of all the essential facts. He was confident that the bill would pass the Senate in February, if not at an earlier date. Edwin A. Start, secretary of the American Forestry Association, who was called upon later, suggested the danger of the bill being thrown into conference by Senate amendments, and Mr. Currier, replying to a question by Mr. Start, expressed his belief, unqualifiedly, that the friends of the measure in the Senate would vote down all amendments and pass the bill as it came from the House.

Ex-Governor Jordan and ex-Senator Chandler were among other speakers at this session. Mr. Jordan brought out the interesting fact that John W. Weeks, the grandfather of Representative John W. Weeks of Massachusetts, the author of the Weeks bill, who represented New Hampshire in the national House of Representatives, assisted, ninety years ago, in naming the peaks of the Presidential range. The ex-governor advocated more care by the state of its own forest lands and less dependence upon national action. Mr. Start emphasized this plea and pointed out the need of the development of American forestry through national, municipal, state, and private action, so correlated and combined as to secure the complete utilization of our forest lands for the fullest continuous production, the national forests forming the nucleus, to be completed and rounded out by the state, the municipality, and the private owner.

There was an interesting discussion of forest taxation, led by Allen Hollis,

secretary of the society, who has given this subject much attention. D. M. Rogers, who has charge of the gypsy and brown-tail moth work for the United States Department of Agriculture, gave a talk on the invasion of the state by these pests, which aroused much interest, as was shown by the rapid fire of questions to which Mr. Rogers was subjected. He held out no hope of entire freedom from this danger, and said most emphatically that the state must adopt a more energetic and liberal policy. He said that conditions as to gypsies are bad in the eastern part of the state and threaten to be worse in other parts. The state cannot appropriate enough money to solve the problem. So far as possible, each town should hire a competent man to superintend the work of control. In the last analysis, it is up to the property owner. Above all, this state needs a man to head the fight who knows the gypsy from A to Z, and who can instruct town officers and property owners. He considered the mountainous northern section of the state as beyond the range of the moths, although he did not regard this as conclusively proved.

Wednesday evening, Austin F. Hawes, state forester of Vermont, gave a sound and suggestive paper on state and town forests. This paper will appear later in *AMERICAN FORESTRY*.

The society reelected its officers, all of whom have done efficient and devoted service: President, Frank W. Rollins; secretary, Allen Hollis; treasurer, George T. Cruft; county vice-presidents, James A. Tufts, William D. Gibbs, the Rev. Daniel Merriman, Charles E. Tilton, William P. Fiske, Isaac Huse, A. T. Childs, Frank H. Foster, Laurence J. Webster, W. C. R. Hale; vice-presidents at large, Herbert Myrick, Henry S. Graves, John D. Quackenbos, Allen Chamberlain, Henry James, Jr., Orton B. Brown, Frank G. Webster, E. Bertram Pike, John S. Runnells, George H. Maxwell; executive committee, Frank W. Rollins, Allen Hollis, George T. Cruft, Robert P. Bass, Montgomery

Rollins, Robert E. Faulkner, Winston Churchill.

Resolutions were adopted authorizing the executive officers to accept gifts of forest lands to the society, if provision be made for the attendant expenses; providing for a committee of two to consult with railroad officials concerning methods of avoiding forest fires; expressing the thanks of the society to the New Hampshire delegation in Congress for their efforts in behalf of the Weeks bill and expressing hopes for its success; requesting President Taft to urge upon Congress early action upon the Weeks bill; authorizing a committee of three to meet individuals and representatives of corporations to plan better cooperation in forestry matters.

This was the first meeting of the society since its incorporation, which is in itself an act of some significance, since the society was incorporated to enable it to become the custodian of forest lands. Residents of the Lake Sunapee country have been exerting themselves to prevent the stripping of a tract of several hundred acres on Sunapee Mountain. Their efforts are about to be crowned with success, and the land when acquired will be placed in the hands of the Society for the Protection of New Hampshire Forests. Thus the work of the society will acquire a new value, and it will have an opportunity to put into practice the principles it has advocated.

THE PHILIPPINE BUREAU OF FORESTRY AND ITS WORK

Prepared under the Direction of George P. Ahern, Director of Forestry, by
W. D. Sterrett, Forester, Bureau of Forestry

[In the February and March numbers of AMERICAN FORESTRY, Barrington Moore discussed the conditions and problems of forestry in the Philippines. The present article, prepared several months ago for this magazine, is a statement of conditions from the men who are facing these problems.]

PURPOSES FOR WHICH CREATED, AND POWERS

THE Bureau of Forestry is intrusted with the control and management of all public forest land, and no public land of any kind can pass into private hands without the sanction of this bureau. The following sections of "The Forest Act" of May 7, 1904, will serve to show in a general way the purposes for which the Bureau of Forestry was established, and its powers:

"Sec. 2. The public forests and forest reserves of the Philippine Islands shall be held and administered for the pro-

tection of the public interests, the utility and safety of the forests and the perpetuation thereof in productive condition by wise use; and it is the purpose of this act to provide for the same.

"Sec. 3. The public forests shall include all unreserved public lands covered with trees of whatever age.

"Sec. 4. Upon the recommendation of the Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, the civil governor may set apart forest reserves from the public lands, and he shall by proclamation declare the establishment of such reserves and the boundaries thereof,

and thereafter such forest reserves shall not be entered, sold, or otherwise disposed of, but shall remain as such for forest uses.

"Sec. 5. The public forests and forest reserves and the timber, firewood, gums, and other products thereof, shall not be sold, entered, leased, or otherwise disposed of except as herein provided.

"Sec. 8. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, shall prescribe such regulations not inconsistent with the provisions of this act as may be expedient or necessary for the protection, management, reproduction, occupancy, and use of the public forests and forest reserves, and the said chief, with the approval of the Secretary of the Interior, is hereby authorized to alter and revise such regulations. He shall in particular provide for the use of the public forests and forest reserves in such manner as to insure for the future a continued supply of valuable timber and other forest products.

"Sec. 10. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may select for sale or disposal, and may sell or dispose of by license, from the public forests and forest reserves, at rates of charge to be established by him in accordance with the provisions of sections 11 and 12 of this act, any timber, firewood for commercial use, gums, resins, and other forest products, whose removal will not be detrimental to the public forests or forest reserves or to the interests which depend upon them.

"Sec. 20. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may, when the public interests so require, make requisition upon the bureau charged with public surveys, to proceed to demarcate, establish on the ground, and erect monuments along the boundaries of any public forest or forest reserves, and it shall be the duty of the last-named bureau to comply with said requisition.

"Sec. 23. Every official, employee, or agent of the Bureau of Forestry is empowered to make arrests without process

in or upon the public forests or forest reserves, or territory adjacent thereto, of any person who is committing or attempting to commit any violation of this act or the regulations established thereunder, and it shall be the duties of governors of provinces, the Philippine Constabulary, and of municipal presidents to assist in making the arrests prescribed in this section when called upon to do so.

"Sec. 25. The cutting, clearing, or destroying of the public forests or forest reserves, or any part thereof, for the purpose of making *cañigins*,* without lawful authority, is hereby prohibited, and whoever, in violation of this provision, shall cut, clear, or destroy the same, for such purpose, or shall wilfully or negligently set fire thereto, shall, upon conviction by a court of competent jurisdiction, be punished by a fine not exceeding a sum equivalent to twice the regular government charge upon the timber so cut, cleared, or destroyed, and, in addition thereto, by imprisonment not exceeding thirty days, in the discretion of the court.

"The cutting, collecting, destroying, or removing of timber or other forest products, stone, or earth from the public forests or forest reserves for any other purpose than making a *cañigin*, without license, permit, or other sufficient authority, is hereby prohibited, and any person who, in violation of this provision, shall so cut, collect, destroy, or remove the same, by himself, through an agent or employee, or for account of another, shall, in addition to the payment of the regular government charge on such timber, forest products, stone, or earth, be subject to the payment of an additional sum equivalent to the regular government charge thereon, which shall be collected as in this act provided in the case of other government charges."

The Public Land Act provides that no application for homestead, sale, or lease of public land will be granted un-

**Cañigins* are a system of shifting cultivation extremely destructive to the forests. See AMERICAN FORESTRY for March, 1910, p. 78.

less it is certified by the Bureau of Forestry that the land is "more valuable for agriculture than for forest uses."

The laws contained in the Forest Act are all that could be asked for as a basis upon which to build up a proper system of forest conservation for the Philippines. All that is needed is more money and trained forest experts to carry on the work.

PRESENT WORK OF THE BUREAU

The work of the Bureau of Forestry is carried on under two divisions—that of administration and that of investigation.

The work of the division of administration includes: Granting and inspection of timber licenses, including cutting regulations to perpetuate the forest; patrol against caningins and trespass; fines for violations of the Forest Act; inspection of public land applied for to be leased, bought, or homesteaded; working plans for large lumber concessions in cooperation with division of investigation. For carrying out the above lines of work, the islands are divided into three administrative districts, with a trained American forester in charge of each, assisted by a number of Filipino rangers. The forester is continuously on the move, and even then is barely able to cover his entire district once within a year, and much of the work has to be done by rangers working alone.

The work of the division of investigation includes: Mapping and land classification; dendrological work; education and publication; silvicultural investigations, and working plans.

The division is mapping the different classes of land, or broad vegetative types. It has already completed Luzon and Mindoro, the maps showing roughly the location of the following classes of land: Commercial forest, non-commercial forest, grass land, and land under cultivation. These maps furnish the basis for determining what areas should be permanently held in public forests or forest reserves and so managed as

to secure a continuous timber supply, the protection of watersheds, and a revenue for the insular government.

The dendrological work includes the botanical identification of tree species, and technological study of the structure, characteristics, and quantity of the woods of different species. This work is carried on in cooperation with the Bureau of Science. The work includes, also, timber testing and durability tests, wood preservatives, and uses and market value of the different kinds of woods. A museum of specimens of Philippine woods has been established, and the public has access to the information relative to Philippine woods collected by the division of investigation.

Education and propaganda work in forestry is under this division, including publication of results of forest investigations and forestry work. The aim is to educate the people to the importance of forest conservation; to keep the people informed concerning the actual work in forestry of the bureau, and its results, and to indicate chances for profitable exploitation of Philippine forest resources. This is done through publications of the bureau, by newspaper and magazine articles, and by illustrated lectures. The Bureau of Forestry must have the hearty support of all patriotic Filipinos, and hence the importance of this propaganda work.

The silvicultural investigation work includes studies of natural and artificial reproduction, especially of important species; forest types or associations of tree species in the forest; rate of growth and form of different species, with mill-scale work to determine how much lumber trees of different sizes and species will cut.

Working plans, or plans of management for areas of public forests which should be permanently held in forest, are prepared by the division of investigation in cooperation with administration. The work of the former furnishes the basis for proper forest management of public forests by the latter division—it investigates, collects infor-

mation, and organizes the work to be subsequently carried on by the division of administration.

WORK OF THE BUREAU FOR THE
COMING YEAR

Commencing with July, 1909, the work of both divisions of the bureau will be concentrated upon the organization of systematic forest control for areas in northern Negros Occidental and in Bataan. General administrative work will be attempted for the first homesteads, for the three districts will continue as before, but detailed forest work will be attempted for the first time on the two areas mentioned. The plan is to take additional areas each year for organization and subsequent practice of detailed forest control and management, until all public forest, which should be retained as such, is taken in hand. The work in Bataan and Negros will form the commencement of this work. Up to the present the administrative work by the Bureau of Forestry on public forest land has been of a very general character, but the bureau has been investigating and locating areas for future intensive administration—areas which the general welfare of the Filipino race demands should be permanently held in public forests, managed in accordance with the principles of forestry. During the latter half of the fiscal year the division of investigation will resume the work of mapping the different classes of land and will probably complete the land classification map for the Philippines.

The limits of the Negros and Bataan forests have been very roughly located; there are probably about 160,000 hectares in the former, and 80,000 in the latter. The Insular Lumber Company is located in the Negros forest, and the Cadwallader Lumber Company in the Bataan forest, which are the two largest companies in the islands, and an important part of the work will be mill-scale and volume work to check up the amount of timber cut by these companies. This will include, also, the collection data as a basis for volume tables

of standing trees, showing the amount of lumber in standing trees of different diameters and species; and for tables showing the amount and grades or quality of lumber cut from logs and trees of different sizes and species and the per centage of waste due to rot, shake, and careless sawing. This information will be of value to all lumbermen in the Philippines and to those intending to go into the lumber business. The bureau by this detailed mill study will determine the most economic methods of milling Philippine timbers and will be able to make recommendations for changes in present methods which will mean a saving to the lumbermen.

The chief forestry work on the Negros and Bataan forests will be in the collection of data as a basis for a detailed working plan or plan of management for the two forests, including topographic and forest maps of the same, with the probable limits of the area which should be permanently held in forest. This data will be gotten more or less in connection with the work of patrol and cutting of trails, which are also important lines of work. For the purposes of patrol, both of the forests have been divided into three range districts, with an educated Filipino ranger in charge of each, and each of these districts subdivided into a number of patrol blocks with Filipino guards to patrol them. Trails will be cut, where there are none already, as boundaries between ranger districts and patrol blocks, and secondary trails made cutting up each patrol block into a number of sub-blocks. These trails will be used for patrol and will be useful as fire lines in case of fire. Topographic and forest data will be collected for each sub-block by surveying out all trails cut, and taking careful topographic and forest notes while running out these trails. In the working plan each sub-block will have a separate description, including the character and condition of the forest, an estimate of the timber, and recommendations as to work to be done—improvements, such as tree plant-

ing, and cutting and logging regulations to perpetuate the forest in case of lumbering.

For the working plan, much information of a political and social nature will be collected: Card catalogue of all officials and influential men, with remarks; lists of licensees, and all men using the forest and on whom dependent; land status work, including location and history of all claims; location of all people in the forest, including a special study of the non-christian tribes (Montescos, Negritos, etc.). It will be the policy of the Bureau of Forestry to encourage ignorant natives in becoming independent farmers, cultivating homesteads of their own. These natives should be encouraged in taking up homesteads on good land, much of which is illegally held by caciques, and not allowed to go back into the forest to make *cañigins* in poorer soil, where they destroy much valuable timber.

In connection with the work of organizing these two permanent forests, the bureau will undertake to establish communal forests for neighboring barrios and municipalities, on the public land most conveniently located to them, from which timber for personal use can be taken without a stumpage charge. This will check the villagers from going a great distance back into the forest to get their timber for personal use, where they do much damage to the forest. Where there is no public forest near the town, the municipality will be encouraged to establish one by planting up public grass land and every assistance possible in the work will be given by the bureau. Experimental planting work in connection with the different municipal schools will be carried on by the Bureau of Forestry, cooperating with the Bureau of Education, which will be a good way to start planting of communal forests.

The general administrative work on the Bataan and Negros forests will include: Granting of licenses to cut timber and other forest products, with regulations as to where and what shall be taken, in order to preserve the productivity of the forest; fines for viola-

tions of licenses; fines for violation of the Forest Act and the forest regulations; *cañigins* without license stopped; inspection of homesteads; more rigid examination and requirements for the approval of the same, and the collection of stumpage charges on forest products in cooperation with municipal treasurers and the Bureau of Internal Revenue. At present the work of collecting stumpage charges is in the hands of the Bureau of Internal Revenue, and is done mainly through municipal treasurers. It is very difficult for these officials, not experts in timber and never getting back into the forest, to properly handle this work. The Bureau of Forestry, cooperating with the municipal treasurers, will be able to secure for the government a much larger revenue from forest products cut in these two forests than has been heretofore collected.

FUTURE NEEDS OF THE BUREAU

"The Bureau of Forestry has in its possession to-day the necessary information and a nucleus of the force to start an active, efficient administration of what should be permanent forest land in the islands."¹ What it will need more and more, in addition to trained Filipino foresters, will be increased appropriations for carrying on the work. This could be provided for by allowing sixty per cent or more of the revenue derived from forest products sold from public forests to be used, under the direction of the Bureau of Forestry, for the maintenance and improvement of the forests.

"In all countries where forestry has been practiced for a long period of years, there has been a steady increase of the revenue from the forest, and this increase has been directly dependent upon the amount spent in the care and protection of these forests. In Prussia in 1850 the government annually spent

¹Circular No. 3, Bureau of Forestry.

P1.85² per hectare, and received a net revenue of P2.30 per hectare. In 1897, the same government spent P6.90 per hectare, and received a net annual revenue of P6.30 per hectare. This is not an isolated case, but is true for the forests of other European states. Careful observation during a long period of years has established the fact that there is a minimum expenditure per hectare for maintenance of forests: anything under this minimum means lack of proper care and a deterioration of the property; and anything in excess, up to a certain point, means improvement of the property, and an increase of revenue."¹

With sixty per cent of the revenue from the sale of forest products, and with the constant increase of the amount this would yield, as would be the case, the Bureau of Forestry would have all the revenue needed for conserving and improving the productivity of public forests. For the first five years, however, the bureau should be allowed all the revenues from the sale of forest products, to provide for the heavy ex-

pense of organizing and making working plans for the different forests throughout the islands, and for the technical and practical training up of Filipino foresters.

In India the cost of administration of the area under forest management is slightly more than fifty per cent of the gross revenue derived from the sale of forest products from the same. The net revenue there is 39 centavos³ per hectare. With an equally intensive system of forest management for Philippine forests, a like net revenue could, after a short period of years, be expected. Assuming that twenty per cent of the land area of the archipelago, or 6,000,000 hectares, should be put under forest management similar to Indian practice, the total yearly net revenue therefrom to the insular government would be P2,340,000. This is not considering the value of these forests for protection of watersheds and for a continuous supply of cheap lumber for the people of the Philippines, secured by forest management.

²These figures are in terms of Philippine Island currency. P indicates peso, which has a value of 50 to 55 cents, United States standard.

³The small coin of the Philippines, one one-hundredth of the peso, or one-half cent of our money.



EDITORIAL

The Second National Conservation Congress

THE keynote of the Second National Conservation Congress is the constructive application of conservation principles to concrete problems. The White House Conference of May, 1908, brought the issue before the country; it showed the need of action, made a direct appeal to patriotism, and energized the movement. The next landmark was the inventory of natural resources published in the report of the National Conservation Commission. Though necessarily incomplete, this was a fully adequate presentation of the basic facts and a succinct formulation of cardinal principles. St. Paul marks the third stage of the advance. The great interests concerned with the problems of conservation will be represented there by men who are leaders in the development of natural resources. These men will attack actual cases and advance definite recommendations, in the light of their business experience and trained ability.

From the program it is evident that the several topics are to be handled from the inside. Such men as A. L. Baker and Wallace Simmons of St. Louis, and T. L. Lewis, president of the United Mine Workers of America, will deal with the industrial aspects of conservation. Forestry will be represented by Henry S. Graves, and water power by Herbert Knox Smith. Judge Ben D. Lindsey, of the Denver Juvenile Court, will discuss the conservation of child life. Dr. Francis E. McVey, of the University of South Dakota, a noted authority, will present a paper on forest taxation, while the discussion of this topic will be conducted by J. B. White, of St. Louis, whose influence in the

lumber world, and effective work in introducing conservative methods into lumbering, are well recognized.

A conspicuous place on the program will be occupied by the topic of public land legislation, with special reference to the proper development of such major resources as minerals and the public range. Another important and practical feature will be the reports of the conservation committees of the great business organizations of the country which have been devoting themselves to the mastery of the problems encountered in their respective fields of enterprise. It is expected that these reports will contribute much new information, many workable suggestions, and not a few positive results.

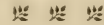
Special interest centers, naturally, about Mr. Pinchot's address on "The Program of Conservation." Those who talk at random against conservation have been asserting that Mr. Pinchot has thus far failed to lay down definite lines along which the ideal of conservation can actually be approached. We consider this criticism altogether unfounded, and believe that those who make it have not taken the pains or felt a desire to acquaint themselves with Mr. Pinchot's brilliant achievements in constructive conservation work. In this address, however, Mr. Pinchot will accept the challenge that has been offered, and will attempt to present a very definite program. This is an exceedingly difficult task. It calls for a rare combination of expert knowledge and constructive statesmanship, a complete command of the subject on both its theoretical and its practical sides. There is no doubt, in our judgment, that he will be entirely equal to the emergency and will acquit himself in a manner which will leave little to be desired.

A Bluff Called

ON ANOTHER page is printed an address delivered by the Forester of the United States before the Denver Real Estate Exchange on the 3d of August. Frequent attacks have been made upon the Forest Service for its alleged policy of shutting homesteaders out of the public lands, thwarting the ambition of the pioneer, and checking the development of the country. This agitation has been especially active in Colorado, where the high altitude sometimes engenders marked extravagance of language. It is characteristic of the direct, incisive methods of the Forester that he went straight to the storm center and examined the situation on the ground in company with some of the severest critics of the Service. To those who have had knowledge of the real situation it has been known all along that the harsh criticisms that have been made have been due in part to exceptional cases of over-zealous administration, but chiefly to persistent misrepresentations, combined with a certain amount of misunderstanding of the laws, the conditions, and the real purpose of the administrators. The latest advices indicate that Mr. Graves has been able to go upon the ground and disprove, even to the critics of the Forest Service, so far as the Colorado forests are concerned, the charges that have been so vociferously made. Admitting that the land pointed out to him is agricultural, he has shown that, instead of amounting to "millions of acres withheld from settlement," it amounts to some patches of a few thousand acres, isolated and in high altitudes, the applications for which have been few, while some of the claims taken up have been abandoned by the settlers. These facts make the sounding charges that have been made look small indeed. Under the Forest Homestead Law of 1906, land suitable for cultivation is made available for settlers as far as applications are made for it, and agricultural lands on the outskirts of the forests are being eliminated from the forests and thrown open to settlement

by the rectification of boundaries, which is going on rapidly as a result of careful surveys, a work of which the readers of this magazine are kept informed from month to month. Ample provision must be made for administrative purposes, as Mr. Graves points out, because a force of rangers and other employees must be maintained for the good of the forest, and it may be added that the welfare and proper maintenance of these men are just as important as those of any other settlers.

In view of these facts, and knowing the honest purpose of the Service and the character of the man at the head of it, it may safely be predicted that he will be equally successful in other cases, or that any real wrongs that exist will be righted as far as the laws permit.



Terrific Fire Losses

UNLESS the general reports of forest fires are more than usually unreliable, the summer of 1910 will leave a conspicuously evil record of irreparable damage done. The known losses are appalling.

Early in the season great dryness started the mischief ahead of time, and throughout some of the choicest timber regions of the northwest the flames have been raging almost continuously ever since. From Wisconsin and Michigan it was recently reported on trustworthy authority that, even if every fire in the country were then extinguished, and no more should start during the rest of the season, the summer would go down in history as the costliest that lumbermen have ever known. The *Portland Oregonian*, toward the end of July, estimated that the total loss in timber and property up to that time in British Columbia, Idaho, Washington, and northern California at \$100,000,000, or double the average annual fire toll; and Montana, where enormous losses are being suffered as this magazine goes to press, was not included.

August 2, in accordance with telegraphed requests from the Western Pine

Manufacturers' Association and the Western Forestry and Conservation Association, the President of the United States wired the Assistant Secretary of War to direct commanding officers of army posts, upon application by the Forest Service, to lend every assistance possible in the suppression of fires. Action was immediately taken by the Service to avail itself of this general opportunity to secure the cooperation of troops. By August 13, some 2,000 men in the employ of the Service were being assisted along the fire-fighting lines by sixteen companies of soldiers where the worst fires were blazing, namely, in several of the national forests of Idaho and Montana and in the Blackfeet Indian Reservation. The Secretary of the Interior also took steps to secure the aid of the Forest Service in fighting fires on the Glacier National Park, which, like the other national parks, is under the jurisdiction of the Department of the Interior.

Thus, all available machinery was promptly set in motion to save the public timber. At this writing, however, it is doubtful whether the greater fires are yet under control. Enough is already known about the situation in the forests to make it certain that they have suffered more heavily than at any time since they were placed under the jurisdiction of the Forest Service. The vast extent of the public property involved may be seen from a single instance. In one forest in Montana there was threatened 400,000,000 feet of timber in a mass, the market value of which was \$4 a thousand on the stump. The expense of fighting fires on the people's property, as this is written, can hardly be less than \$15,000 a day. No one can really conceive the damage that is being done to the future forest in the injury and destruction of young growth.

Fire is not a mysterious enemy. By the proper means it can be met and conquered, and indeed largely held back from the invasion of the forest. The best methods of prevention are known and effectual. The weakness in the situation is lack of men and money for

adequate protection. Surely, the national forests ought not to be exposed to such losses by a penurious policy which leaves a mere handful of men to patrol and protect the large areas that are repeatedly placed in danger. Not to speak of economic waste, duty to the public, respect for the good name of the Nation, require that Congress, without further delay or argument, should give funds enough to keep the national forests at all times fully manned.



Mr. Roosevelt and the English Song Birds

IN *The Outlook* for August, Mr. Theodore Roosevelt writes of English song birds and their songs with as much obvious zest and discrimination as if to see and hear them had been one of the main objects of his visit to England. One day, between the funeral of King Edward and the Guildhall speech, he found or made the time, amidst official, social, and academic honors and opportunities that would have bewildered a head less sound and flattered a man less sincere, he stole away into the fields and woods with a delightful and learned companion, and there made first-hand acquaintance with the singing birds which till then had been his friends only in familiar books. And now, while still, as always, very fully occupied, and at the same time playing a public rôle that calls constantly for great tact and wisdom, he once more finds or makes the time to tell American readers of this naturalist's excursion.

Altogether apart from the charm and value of the *Outlook* article as a contribution to bird-lore, this characteristic episode of Mr. Roosevelt's days in England carries a stimulus and a challenge. Is any one of us more engrossed with large affairs, or weighted with graver responsibilities, than was Mr. Roosevelt when he dropped for half a day out of the insistent world and harkened eagerly to the notes of the nightingale, the cuckoo, and the English robin? We take both our business and ourselves too seriously. Our sense of proportion is

benumbed, because we have too long laid one-sided emphasis on isolated projects and pursuits. We are possessed by our daily tasks; we can no longer shake ourselves free of them. We quickly lose the power of interesting ourselves in anything except the immediate objects of our endeavors, which are magnified under our unflickering attention till they react upon us hypnotically, enslaving us to them. We come to consider ourselves too busy to spare the time for any pleasure, any duty, that does not seem to belong in the little world to which we have deliberately restricted our thinking and our feeling. Freshness of perception is dulled, elasticity of mind stiffens, sympathies contract, in the unswerving pursuit of single aims.

Once again the many-sided Mr. Roosevelt has reminded us that the world has countless interests, and shown us how to turn, with equal profit and enjoyment, from the greater to the lesser elements of a fully rounded life. It is a lesson sorely needed. When we have mastered it the greater tasks that engage us—perhaps not so great as our habits and conceits would make them—will no longer hold absolute dominion over us; we shall begin to live more completely. It will be easier then to reach the busy man, become less busy in his own eyes, and to engage his interest and help, whether it be in some vast project in his own specialty or something far more remote, such as a plan to conserve forests which he has never seen, for a future which he cannot himself enjoy.



Consistency

BULLETIN No. 5 of the National Conservation Association summarizes and criticizes the legislation dealing with the development of natural resources which was passed or considered by the last Congress. The gist of the results accomplished is given in the following words:

"The National Conservation Association has substantial cause for satisfac-

tion in the progress achieved during the session of Congress just closed. In spite of all opposition, the principles for which we stand have been enacted into law in a considerable number of cases, and are represented in many bills still awaiting action. More than one avenue to monopolistic grabbing of the people's property has been closed, but much still remains to be done. The friends of the conservation movement are in better position to continue the fight than seemed possible when the session of Congress began.

"Throughout the session the association followed the legislative situation closely. Its officers, through bulletins, have endeavored to keep all members informed regarding the more urgent measures favorable to conservation and those opposed to it. The officers of the association are keenly sensible of the vigorous cooperation on the part of its members toward the enactment of good conservation laws and the defeat of proposed bad legislation.

"Early in the recent session Senator Nelson introduced nine conservation bills drafted in the Interior Department. These bills, which were described in the first Bulletin sent to the members of the association, were mostly bad. The Timber Sale Bill (S. 5489) in particular was wholly indefensible. For five of these bills substitutes (H. R. 23698 to 23702 inclusive) embodying conservation principles were prepared by the association, covering all important phases of the conservation program of the administration. These were introduced by Representative Gronna of North Dakota, and are before Congress for consideration at its next session. The substitute for the Withdrawal Bill suggested by the association was enacted into law with amendments. * * * The three remaining conservation bills proposed by the administration, which were of relatively small importance, were passed in a form different from that in which they were introduced, and one of them in greatly improved form. The act for issuing \$20,000,000 of bonds to hasten the com-

pletion of reclamation projects (Public 289) was advocated by the administration."

The Bulletin closes with a notable paragraph:

"It is unfortunate that the Interior Department has absolutely refused to approve rights of way for municipal water supply, irrigation, and water power wherever the lands affected are believed to be valuable for water power. This policy has continued for a year. It amounts to the absolute stoppage of water power development throughout the arid west, and has done much to create the totally false conception of conservation in that region. The Forest Service has wisely rejected the proposals of the Interior Department looking to the establishment of the same policy in national forests."

Mr. Ballinger has not hesitated to let the country know that he has very decided opinions upon conservation, and it was gathered from repeated statements that one of his ideas is to open up resources and prevent the discouragement to enterprise that would follow unwise restrictive measures. True, this idea was not the Secretary's own by right of discovery, because it is part and parcel of the conservation program as it was arranged by those who were its true originators. But it seemed as unmistakable as anything the Secretary has put into words—and the Secretary is inclined toward calling a spade a spade at the very least—that he was practically and theoretically opposed to a sort of conservation which nobody, after all, was advocating. It is therefore somewhat disconcerting to find that in one direction he appears to be determined to restrict, instead of properly developing, the use of one of the great resources of which he has control.

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Two Remarkable Examples of Reforestation

THE illustrated article by Mr. Hovgaard in this issue of *AMERICAN FORESTRY* on the "Reforestation of Denmark," together with the pictures and notes of forest plantations in the Karst

of Austria, may well arrest attention. In both of these instances, so different and so widely separated, effect has followed cause, not once but twice; first, when the forest was stripped away and the land was laid waste, and second, when the forest was replaced by painful experiment and the land became again productive. In both cases, too, the evil effect of forest removal, as well as the good effect of forest restoration, has been shown in a very definite influence upon local climate; agriculture was stopped or impoverished when the forest masses were removed, and was revived and developed as they were put back.

But, of course, the chief lesson so powerfully enforced by these examples is that the possibilities of forest production are almost unlimited. The work in Denmark and in the Karst was done not only against the deterring weight of general indifference and incredulity, but to some extent in defiance of expert opinion. In Denmark particularly, it was sheer pluck and insistence, backed by patriotic sacrifice and the outlay of private funds, which converted the devastated heath to woods and pastures and fields, through unfaltering belief in the forest as a crop and as a protector and improver of the soil.

In the Sandhill region of Nebraska a problem of similar difficulty confronts the American forester, and it is a source of satisfaction that in Brussels, Belgium, this month, an American professor of forestry will be able to present the results of successful national work in that region, before the International Association of Forest Experiment Stations. But the opportunities are endless, and barely a beginning has been made in the work of reforestation here. There is great encouragement, therefore, in the successful object lessons furnished by Denmark and by Austria.

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Sharp Practice in the Basket-willow Industry

CONDITIONS have been brought to light in the basket-willow industry which are exceedingly unsatisfactory both to the grower and to the consumer.

At best, willow growers have to meet the competition of split-wood baskets, as well as that of the cheap imported willow-ware which floods the American market in spite of a relatively high tariff. But the chief difficulty they have to face, in certain centers at least, has neither economic nor moral justification. This is the pressure of monopoly, brought to bear by the middlemen. There is danger that the future development of the industry will be seriously hampered unless this pressure is relieved.

The basket-makers who have in the past grown the greater part of the willows produced in this country have been immigrants from the willow-producing centers of Europe, with only a slight knowledge of the English language and no knowledge of business methods. As a consequence, it has been a simple matter for men with capital to gain almost a complete monopoly of the willow-growing business. Years ago, when most of the basket-makers came to this country, there was an open market for both raw material and manufactured goods. As a rule, the more industrious then made a good living. Most of them were soon able to pay for a home and a few acres of land. Gradually, however, as the industry grew larger, the influence of the middleman began to be felt. At first, jobbers paid good prices; but as they gained more and more control of the market they began to "squeeze" here and there. The small grower, with his year's work tied up in his willow crop, was an easy mark for capital. Before long, he found that he must either do business with the jobber or not do business at all. If he tried to sell his crop independently, he was underbid, and the need of cash prevented him from holding his crop or disposing of it in small lots. Thus, most of the growers who continued in the one-sided game were forced into line.

To-day, in certain localities where there should be a fair profit in willow growing and in basket-making, the big dealers so manipulate things that they get the profit both ways, and hardly a living is left to the willow producer or to the basket-maker. In fact, many growers and basket-makers who formerly were prosperous do not now even own their homes, and mortgages cover everything they possess. The mortgages are largely held by the big willow dealers, who thus have complete control of the situation.

This evil state of affairs is not universal, it is true. In the middle western states it is far less grave than in some parts of the east, though even there the middleman undoubtedly gets some of the profits which should go to the producer or consumer of raw material. In Indiana and Ohio, especially, the growers get good prices, owing to the open competition among the buyers and users of willows; and in these places willow culture is prospering. But the bulk of the willow crop is raised in the east, over a good part of which monopoly presses heavily.

The harmful results of such a system hardly need to be pointed out. Who will embark in an industry in the face of this sort of discouragement? The production of willows must decline. Those who can get out of the business will do so, and those who cannot get out, because of limited resources or limited skill, tend to become little better than slaves. Lower quality and higher prices will impair the market for the product, and subject the consumer to the hardship of paying more for poorer ware. It is high time that intelligence and enterprise should take hold of this situation, free the industry from this costly burden, and assert their claim to a legitimate share of the profits.



NATIONAL FOREST WORK

Cruising Southwestern Forests

The task of estimating the present stand of saw timber on each township and section of national forest land in the states of Arizona, New Mexico, Arkansas, and Florida has been undertaken. It will probably take until the close of the year 1912 to complete the work, but when it is done the government will know definitely how much timber can safely be cut from the national forests in these states, and just where the timber is that can be most advantageously sold.

When a forest has once been covered by such a reconnaissance, purchasers and forest officers can agree on negotiations for timber sales, advertisements of the timber can be placed, bids made, and contracts let. Up to the present time, in Arizona, all the saw timber on the Coconino forest has been cruised, including the Grand Canyon division; all on the Prescott; more than half of the Sitgreaves, about one-fifth of the Apache; in New Mexico, the Gallinas Division of the Lincoln, and half of the Pecos. Field parties are now at work in Arkansas on the Arkansas National Forest, and in Florida on the Choctawhatchee.

During the present field season, it is anticipated that the estimates covering the Apache, Gila, and Pecos, in New Mexico, and the Mount Graham Division of the Crook, in Arizona, can be completed, and that for the Manzano, in New Mexico, which was estimated in 1908, thoroughly revised. During the winter of 1910 and 1911 undoubtedly the Choctawhatchee and Ocala, in Florida, and the Arkansas and Ozark, in Arkansas, can be finished. Thus, it is likely that by 1913 all saw timber in District 3, which comprises the forests of the south and southwest, will be cruised and mapped so that purchasers can negotiate sales promptly and the government will know just what timber should be sold first and how much it can safely dispose of.



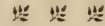
Large California Timber Sale

With the purpose of contributing to the development of northwestern California, the Department of Agriculture has offered to sell about 1,000,000,000 feet of timber in the Trinity National Forest in that state. This is said to be the largest output of the national woodlands ever offered for sale at one time.

In order to encourage the building of a railroad, the department decided to sell all

timber which can be safely cut and removed on the north and east sides of Grouse Creek and of Hay Fork of Trinity River, covering an area of 200,000 acres.

The government will not permit a monopoly by one company of all the timber in a given locality or place it in private hands for speculation.



Changes of Boundary

The President has signed a proclamation eliminating 383,809 acres from the Coronado National Forest in Arizona, and adding 15,120 acres. These changes are the result of a careful field examination made last summer by the United States Department of Agriculture in pursuance of a general plan for the correction of all national forest boundaries.

Another Presidential proclamation eliminates 16,012 acres from the Deerlodge National Forest, Montana, and transfers approximately 33,358 acres from the Deerlodge to the Beaverhead National Forest.



A Contribution to Silvics

The dendrological laboratory of the United States Forest Service has completed a study which shows that the conditions of soil and site which affect the height growth of a given species of tree affect also the length of the wood fibers. Foresters are familiar with the fact that the same species of tree grows very differently in height in different situations, and also develops considerable differences of wood. For this reason, they always seek to discover the exact conditions under which a tree will have to grow if the attempt is made to use it in forestry. They distinguish very carefully what is called "the quality of locality," which is the technical name for these conditions in a given case. The discovery made by the Forest Service demonstrates, for the species that was studied, that the quality of locality also determines whether the average length of wood fibers will be greater or less than the average length for all conditions. The better the situation, the longer the wood fibers.

So far as known at present, the subject had not previously been investigated. Its scientific value is obvious. Its practical value lies in the fact that by the microscopic

methods employed in this case it will doubtless prove possible, in time, to determine the silvicultural possibilities of a species, in part at least, in the laboratory.

STATE WORK

Wisconsin Wood-using Industries

A pamphlet on the wood-using industries of Wisconsin has been published by the state board of forestry. The report is the first authentic review of the several industries in the state of which the product of the forests is the principal raw material utilized, and sets forth clearly facts and figures that demand the attention of every manufacturer. It is the second of the cooperative studies to appear, the work having been done by Franklin H. Smith, of the United States Forest Service, under joint direction of the office of wood utilization of the Service, and the state forester of Wisconsin.

The report embraces in detail figures that show the consumption of wood by industries and species, and also the quantities derived from the forests of Wisconsin and from without the state; the uses of the different kinds of wood; the relative prices paid by the industries for the various woods consumed, and other data pertaining to the manufactures.

The wood-using industries of Wisconsin represent a very large part of the wealth of the state that is dependent upon its natural resources. It is to the advantage of all to encourage the fullest development consistent with proper protection of the forests, to the end that the manufacturing interests of the state may continue to have adequate supplies of raw material and prosper accordingly.

This line of work was recently inaugurated by the state of Massachusetts, which has also published a report, in the preparation of which the Forest Service took a part by the cooperation of Mr. Hu Maxwell of the Service. The first essential in using the forest economically is to use economically the wood which the forest produces. Information bearing upon the present methods of using wood is therefore of prime importance, not only to the several states and their citizens, but to the country as a whole. The wood-using industries must be assured that they will continue to obtain their raw materials.

Assistant State Forester in New Jersey

Charles P. Wilbur, of New Brunswick, who has been at work on one of the national forests in Idaho, has been selected by Alfred N. Gaskill, forester to the New Jersey forest park reservation commission, as assistant forester to the commission.



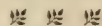
Results on Experimental Forest in Indiana

A recent inspection of the 2,000-acre experimental forest which is maintained by the state of Indiana near Henryville showed that the measures employed to protect and improve the forest are meeting with good success.



Working for New Forest Law in Alabama

John H. Wallace, Jr., commissioner of the department of game and fish in the state of Alabama, is busy preparing to draw up a comprehensive forest law for the state, so that he may have his recommendations in tangible shape to present to the legislature at its next session. He expects to secure the enactment of a progressive measure.



Chestnut Blight in Pennsylvania

The state forest department of Pennsylvania has arranged to send competent men from the state forest academy at Mont Alto to the neighborhood of Bryn Mawr, Haverford, and Ardmore, in order to do what can be done toward the suppression of the chestnut blight, which has attacked and destroyed large numbers of trees throughout Montgomery and Delaware counties.

The Proposed Nebraska State Forest

Active steps are being taken to create a state forest of about 2,000 acres near Omaha and Bellevue, Nebraska, on the Missouri River. The project was broached at the Nebraska conservation congress at Lincoln last spring, and has the support of such influential men as Prof. George E. Condra, president of the Nebraska conservation commission, and Dr. A. A. Tyler, professor of biology at Bellevue College. Now the Forest Service has been requested to send one of its members to examine the tract and report upon its suitability for forest purposes. According to present plans, the examination will be made this month.

A Fire Handbook for California

The California state board of forestry has issued a handbook for the purpose of exhorting the people of the state to prompt action in the suppression of forest fires and proper care in preventing them. It is brief and very much to the point. A summary of the forest laws, rules for the prevention of fires, instructions to fire fighters, and a list of fire-wardens are included. The object has been to appeal to individual initiative. As the state forester says in his notice to the public, on the inside cover: "Nine out of ten forest fires would be forestalled if every Californian were to read this little book and govern his conduct by what it contains." The handbook is distributed free upon application.

EDUCATION

New Head of Maine University Forestry Department

John Manvers Briscoe, of the United States Forest Service, has accepted the position of professor of forestry, in charge of the department of forestry at the University of Maine, Orono, Me., and will take up his new duties at the opening of the fall term.

Mr. Briscoe was born in Pottsville, Pa., July 22, 1878. After attending college, he entered the Yale Forest School, from which he was graduated with the class of 1909. He then took the United States Civil Service examination for the position of forest assistant in the Forest Service, passed it successfully, and was appointed. While in the service he has been specially connected with cooperative work in the Branch of Silviculture and with studies in the section of silvics. He was engaged in reconnaissance work in the Choc-tawhatchee National Forest, in Florida, and, more recently, accompanied Mr. Raphael Zon, chief of the section of silvics, in a field examination of the possibilities of growing eucalypts in Florida, particularly in the Everglades region.

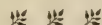


Forestry at Massachusetts Agricultural College

F. F. Moon, for some time connected with the department of forestry in New York, has accepted the position of professor in charge of the new department of forestry which has just been established at the Massachusetts Agricultural College. Mr. Moon was graduated from Amherst College in 1901, and thereafter spent two years at

the Harvard Medical School. Subsequently, he completed a course in forestry in Yale Forest School, obtaining the degree of Master of Forestry.

It is anticipated that the new department of forestry will develop rapidly. A good proportion of the men now in the college entered with the idea of making forestry a major study.



To Train for Field and Forest

When the country life commission of the state of Washington, appointed recently by Governor Marion E. Hay, meets in Spokane the week of November 14, plans will be presented for a model community center and consolidated country school, to be established in one of the rural districts adjoining Spokane, early in 1911.

David Brown, of Spokane, chairman of the commission, announces that Governor Hay, and possibly Colonel Roosevelt, will attend the conference and assist in formulating a practical plan for the betterment of life on the farm, along the lines suggested in the report of the Roosevelt commission on country life, which, headed by Prof. Liberty Hyde Bailey, of Ithaca, N. Y., made a tour of the larger farming districts of the United States the latter part of 1908 and early in 1909.

This is to be the preliminary step of a nation-wide movement, cooperative with the various states and territories, in an endeavor to teach the youth of the land the fundamental principles of agriculture and domestic economy and manual and industrial training, also giving the farmers in the communities

the benefit of the most approved methods of agriculture and allied subjects. The community center is designed to furnish a place where men and women can meet for the interchange of ideas.

Primarily, the school is for the average boy and girl, whose institutional education ends even before they finish the secondary school, the purpose being to train them to become useful men and women and capable of supporting themselves, and thus adding to the wealth production of the country at large and the districts in which they live, and to better their condition of life.

The Washington commission has prepared tentative plans for a community center, including a consolidated rural school. It is

designed to cover ten acres and will serve a school area of thirty-six square miles, the most distant point being three miles. In addition to the school building, the plans show a large community hall, residence for the principal and supervisor, athletic and play grounds, tennis court, pressure water tanks for domestic, lawn, irrigation, stock and fire uses, and plots for the practice of agriculture, horticulture, floriculture, and forestry. Surrounding and bisecting the tracts will be models of good road building.

The school and other buildings will be under the direction of a principal, trained in the various branches of agriculture and familiar with conditions in the northwest.—*Lumber Review*.

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NEWS AND NOTES

Forestry at the Appalachian Exposition

A building has been allotted to the forestry and mining exhibits at the Appalachian Exposition, which opens September 12 at Knoxville, and lasts till October 12. The forestry exhibit will be in charge of Mr. W. M. Goodman, director-general of the exposition. who keenly realizes the educational opportunity that is thus offered. Lumbermen throughout the state have shown their interest in the exhibit by contributing samples of southern woods.

The United States Forest Service will have an important share in the forestry exhibit. It has furnished transparencies and bromide enlargements showing types of the forests in the Appalachian region and elsewhere, the relation of forests to farm, the effect of fire and careless methods of lumbering upon the forest, methods of lumbering in the Southern Appalachian region, conservative versus wasteful methods of lumbering, different wood-using industries, good and bad methods

of turpentine, work on the national forests, and the effect of forests upon stream-flow and erosion.

Charts loaned by the Service will show the lengthened life given to mine timbers, fence posts, railroad ties, and the like, by preservative treatment. Actual specimens of mine timbers, treated and untreated, which have been in mines for various lengths of time will give tangible illustration of the value of preservatives. Maps will present the various natural resources of the United States and the rest of North America; the navigable waterways; mineral deposits; the various uses to which all classes of lands will probably be put in the future when conservative use of the land has been fully developed; forest regions; the location of the national forests and of United States reclamation projects; the proposed systems of inland waterways, and the present and possible future development of water power in the Appalachian region. A low-relief map of the region will also be exhibited.

The results will be shown of pulp investigations with paper made from the waste of lumbering in the exploitation of various trees whose range extends to the Appalachians; and to these will be added maps of the ranges of the trees concerned and illustrations of the methods used in utilizing waste by this means.

Twenty-one commercially important species of trees will be displayed, cut to show the different sections, and accompanied by range maps of the species. An entire white oak tree, cut in logs of regulation length, will be exhibited side by side with the products that can be made from the various logs when all parts of the tree are utilized to the best advantage. Veneer will be shown from the butt log, lumber from the second, railroad ties from the third, cordwood from the top—cut to four inches in diameter—and from the large branches.

Tannin extract and materials obtained through distillation of oak, namely, charcoal, acetates, oils, and alcohol, will be shown as part of this exhibit. Products of the turpentine industry will be shown, and actual trunks of trees will show the good and bad methods of turpentineing. In addition, there will be detachable-tooth circular saws and band saws, together with logs cut by them, to demonstrate the economy secured by using band saws instead of circular saws.



Kansas State Fair Exhibit

The Forest Service will have a forestry exhibit at the Kansas state fair, held at Hutchinson, Kans., September 10 to 17. This will be devoted primarily to showing the benefits of tree planting. Pictures of plantations of species suitable to that region will be shown, as well as cross-sections of trees specially adapted for planting in Kansas. Prof. George L. Clothier will deliver illustrated lectures on tree planting in Kansas.



Attractive Reminder

The Western Forestry and Conservation Association has gotten out, in their campaign calling attention to the forest fire menace, a most attractive sticker, on which, in white lettering against a red background, is the following statement:

"\$100,000,000 A YEAR IS CIRCULATED IN THE PACIFIC NORTHWEST BY THE LUMBER INDUSTRY. YOU SHARE IT. BURNED TIMBER PAYS NO WAGES. HELP PROTECT THE FORESTS FROM FIRE."

Association for Care of City Trees

The American Association for the Planting and Care of City Trees was recently organized in Brooklyn, N. Y. The purpose of the association is to establish a movement for the planting and care of trees and shrubbery in city streets, and in the yards and about the homes of the citizens, by arousing locality interest and pride and inducing organized local action. The officers chosen temporarily are: President, John J. Schoonhoven, M.A.; vice-presidents, Prof. Henry S. Graves, W. A. Murrill, Ph.D., and Miss Julia E. Rogers (director of the nature club, "Country Life in America"); Secretary, Miss Anna Billings Gallup (curator, Children's Museum); treasurer, Miss Harriet M. Walker; forester, J. J. Levison. The committees and their chairmen are: Membership, Miss M. W. Carmichael; literature, Miss Gallup; schools and neighborhoods, Miss Annie C. Patterson; extension, Mr. Levison; finance, Miss Walker.



Fungus to Destroy Brown-tail Moths

As a result of encouraging experiments made under the direction of Mr. F. W. Rane, state forester of Massachusetts, a fungus called *empusa* is now being planted in various parts of that state in the effort to get control of the brown-tail moth. The caterpillars of the moth eat this fungus, which is fatal to them, and rapidly communicate the disease of which they die to others of their kind.



"Silk" from Wood Pulp

An English firm is said to be putting half a million dollars into a plant in Pennsylvania for the manufacture of silk from pulp wood. For the past two years the manufacture of this silk has been going on in England. The product is called viscose silk, and is said to be a very good imitation of the genuine.



Soldiers as Fire Fighters

The Western Pine Manufacturers' Association believes that government troops stationed in states where forest fires may occur ought to be instructed in the art of fighting such fires, and be made available for that purpose. They have addressed a resolution to the President to that effect.

Better Methods for Getting Turpentine

Results of the efforts of the United States Department of Agriculture to introduce in place of the box system of turpentine, which has been so destructive of the pine forests of the south, the much less injurious cup and gutter or cup and apron system, are evidenced in resolutions recently adopted by the executive committee of the Consolidated Naval Stores Company, a representative association of naval stores producers. The resolutions were as follows:

"WHEREAS the experiment made by the United States government, as is shown by the various bulletins from the Bureau of Forestry, as well as the experiments of individuals, and the practical results obtained by the large number of operators, it appears that the use of cups in the gathering of crude gum yields much larger results in quantity of spirits of turpentine produced, and a very great increase of the grades of rosin, as compared with the old system of boxing; and

"WHEREAS it appears that the use of cups is to the interest of producer and factor, tending to increase and perpetuate the life of an industry in which we are engaged, and to the general good and upbuilding of which we pledge our hearty support; therefore, be it

"Resolved, That we, the members of the executive committee of the Consolidated Naval Stores Company pledge ourselves to use every influence at our respective commands toward bringing about as near as possible the universal use of cups as against boxes in the production of naval stores.

"Resolved further, That we now declare it to be the policy of the Consolidated Naval Stores Company to look with disfavor on the boxing of any timber for turpentine purposes in which the Consolidated Naval Stores Company owns any interest."

Lumbermen and Conservation

Lumbermen throughout the country are taking the deepest interest in the second meeting of the National Conservation Congress, to be held in St. Paul September 5-9.

Committed as to its practical conservation, the lumber industry, which will be affected more vitally than any other by the action taken by the congress, should be alert to see that the constructive conservation work of the last two years is strengthened and continued at this meeting, and that no backward step be taken. The deliberations of this congress will have direct results in legislation, both national and state.—*New York Lumber and Trade Journal*.

Large Purchase in Labrador

A New York syndicate headed by C. D. Stanford and R. H. Wing, of Bangor, Me., has acquired from the Anglo-American Development Company the timber land rights in Labrador, consisting of 8,865,920 acres, with an estimated stumpage of 30,000,000,000 feet. The terms of the lease require the company to pay the government of Newfoundland an annual rental of \$4 per square mile for the first year, and \$2 per square mile for each succeeding year for fifty years, with privilege of renewal for forty-nine years. The company plans to cut the timber so as to make the supply perpetual; to establish pulp mills and market the product in the United States and Europe.—*Timberman*.

Mining Company to Plant

The Pocahontas Coal and Coke Company, of West Virginia, has purchased a tract of 5,000 acres in McDowell County for the purpose of reforestation. This land will eventually be planted with trees of various kinds and the result watched with interest, as on this experiment depends in a large measure any future work along this line. The scarcity of mine timbers is beginning to be noticed in this section, and large timber companies are constantly cutting off trees, none of which are replaced. The action of the Pocahontas Coal and Coke Company is one which cannot be too highly commended, as it may mean that this section will in the years to come again be visited by the axes of the woodsman and will not have to depend altogether in the future on other parts of the country for its timber.—*Huntington (W. Va.) Advertiser*.

A Correction

In the July number of *AMERICAN FORESTRY*, on page 396, it was said of the section of timber physics at the Forest Products Laboratory, Madison, Wis.: "This section has in hand at present a microscopic examination of American woods for the purpose of developing a key to their identification based on the structure of the wood. * * *" This statement is erroneous. The work described is in progress, but it is carried on at the Dendrological Laboratory in Washington, D. C., under the supervision of the dendrologist.

AGRICULTURAL LANDS IN NATIONAL FORESTS

An Address by Forester Henry S. Graves to the Denver Real Estate Exchange, August 3

THE object of my present visit to Colorado is two-fold. First, to inspect personally certain forests which I have not in the past had an opportunity to visit, and to meet as many of the people using these forests as possible. Second, to investigate the charges that the administration of the national forests is retarding agricultural settlement in Colorado.

The statement has been repeatedly made that there are in the national forests of Colorado large areas of land suitable for cultivation, and that the Forest Service is withholding these lands from settlement. During the past year the specific charge has been reiterated in Congress, in public meetings, and in the press that there are hundreds of thousands of acres of agricultural land in the national forests of this state withheld from settlement.

These charges have been so persistent and, if true, are of such a serious nature, that I have considered it necessary to investigate personally whether there are facts to justify them. A trip was accordingly planned to enable me to visit certain forests where it is claimed that the largest areas of agricultural lands exist.

The Colorado Stock Growers' Association, at its recent meeting at Grand Junction, appointed a committee to assist me in this matter and advised local associations to appoint similar committees. On July 21 I attended the Gunnison County Stock Growers' Association at Gunnison and met two members of the committee of the state association and the full committee of the local county association. Two men, Mr. T. W. Gray and Mr. William Hartman of Gunnison, were designated to accompany me in the Gunnison forest and show me the conditions, especially certain areas about whose administration by the Forest Service there has been public criticism.

The areas in the Gunnison forest about which there has been public comment are certain open parks in the interior of the forest, notably Union and Taylor parks. It specially was desired that I should see these two parks.

Union Park comprises some 3,000 acres, and is situated at an elevation of over 9,000 feet. There are two classes of land—the

bottom lands skirting the streams, and the intervening rolling sage-brush land. At a guess, I would say that the former occupies about one-fourth of the area. The bottom lands are practically all patented under placer claims, and the nearby water apparently all controlled. I do not know that any one ever expressed a desire to settle on the rolling sage-brush lands under the existing conditions.

Taylor Park, situated at a still higher elevation, comprises probably ten or twelve thousand acres. Like Union Park, there are the two classes of land—those readily irrigable, and the higher, rough, rolling sage-brush areas. I would roughly estimate the former to occupy some twenty per cent. That portion of the park which covers the lands presenting the best possibilities for hay farms has been withdrawn as a reservoir site for the Reclamation Service. It has been claimed that the Forest Service has taken the position that areas at this high elevation would not be listed under the Homestead Act, on the ground that the climate is too rigorous for agriculture.

There have been only two applications for homesteads in Taylor Park. Both have been reported favorably to the forest officers and would have been opened to entry if they had not conflicted with the existing withdrawal for the Reclamation Service project. These applications were, of course, rejected, and I am informed that they are the only applications rejected in the Gunnison forest.

My itinerary took me next through the Sopris forest, over Taylor Pass, and Castle Creek down to Aspen. In this forest, as elsewhere, there are occasional restricted areas of unquestioned agricultural value. Bottoms along the narrow valleys, flats at the confluence of streams, and small benches near water, offer opportunities for farming. The best of these have been appropriated, and the others are being taken up under the Forest Homestead Act, as they are desired by settlers. These areas, in the aggregate, are not large because of the rough topography of the country, but settlers are not being excluded from homesteading on such as exist.

One of the forests about which there has been the greatest criticism is the White River forest. The trip through this forest was

made from New Castle to Yampa. The itinerary took our party first up the west branch of Elk Creek over the flat divide to White River above Meeker, thence up the north fork of the White River, up Snell Creek, down Rough Creek to Pyramid; thence up Bunker Creek on the Spronx trail, by Chaffee's mill, and down the Pinnacle road to Yampa. At Yampa I was met by Senator Ammons, who accompanied the party on a trip into the forest to inspect the kind of land which was being listed for homesteads.

The criticisms with reference to this forest concern three classes of land. First, the high parks. Second, certain areas at lower elevations covered with aspen. Third, lands near the edge of the forest covered with aspen and small oaks.

There are on the high plateaus of this forest a good many open parks, at 9,000 to 10,000 feet elevation. In some cases these open areas are natural parks, comprising swales between the intervening higher ground. Other areas constitute openings interspersed between patches of forest, which by natural reproduction are gradually being restored to tree growth. It is believed by some that many of these high areas can be brought under cultivation, at least, for the production of hay. This possibility the Forest Service does not deny, and we are prepared to encourage such development.

In proof of this, let me state that four applications were made for land on the high country above West Elk Creek. The land was opened to entry. Three of the applicants abandoned their claims very quickly, and the fourth worked a year, plowing some of the land and planting timothy and winter wheat. This last and most persistent of the applicants was a Mr. Lyke, who, with his two sons, operates a sawmill in the forest. I met these men and discussed the matter with them. They felt that possibly a continuance of cultivation for several years would bring the soil into such a condition that timothy could be produced in paying quantities. But they were unable to make the necessary investments to carry on what they considered an experiment with doubtful results. I cite these instances to show that the Forest Service is not standing in the way of the settlement of these areas.

The second class of lands in question includes those areas at lower elevations whose configuration and character of soil permit cultivation. These are in many cases covered with a growth of aspen and are locally called aspen lands. These areas are situated in the bottoms between the ridges, in coves, on benches at the head of gulches, on small mesas, and on the lower slopes of broader valleys. They do not occur in solid bodies, but are scattered. There is really no dispute about these lands.

Senator Ammons accompanied us upon an inspection of certain typical aspen areas near Yampa, where they are said to be as abundant

as anywhere in the forest. We seemed to be in entire agreement as to what ought to be brought under cultivation. Applications have been made from time to time for such areas, and the land has been opened to entry under the Forest Homestead Act. In other words, the Service has been opening them to settlement when they are desired. That there are scattered areas not being settled, is due to the fact that they have not been requested, exactly as there are areas outside the forest well susceptible of cultivation, that have not been taken up.

The third class of land is that near the borders of the forest, which, it is alleged, is not strictly forest land. During the past two years the Forest Service has been examining very closely the boundaries of the forests. Maps have been made showing the character of the land and the vegetative cover, and the local officers have made recommendations regarding eliminations of certain areas not required for forest purposes. In this boundary revision the principles followed by the forest officers are to include those areas which should be used for the production of timber and wood, and those areas on which the cover of trees, brush, or other vegetation should be strictly protected for the regulation of water flow, prevention of wash, slides, or for the other protective purposes. Bodies of agricultural land, pure grazing land, or other classes of land not required for the above-mentioned forest or protective purposes are to be excluded.

Under this policy, established by my predecessor and which I approve, there have already been extensive eliminations, amounting in this state, I believe, to over 500,000 acres. In applying the details of this work, any large bodies of agricultural land are taken out of the forest.

It is not the design, however, to make an extensive elimination of forest land in order to eliminate by presidential proclamation scattered patches of agricultural land which may be located here and there between the ridges. The boundary lines are drawn by legal subdivisions and practical questions of administration are taken into consideration. Sometimes there is a high ridge with good forest growth on the moist slope, but poor growth on the other side. Such a ridge is included for the good forest growth. Many times the poor slope can be restored to good growth or at least the forest upon it very much improved. We are still working on this problem. When the work is fully completed, I do not believe that there will be legitimate cause for criticism of the boundary lines.

As a result of what I myself have seen on this trip and of what I learn from our forest officers of other forests, it is clear to me that there has been a great deal of public misunderstanding of the possible amount of agricultural land in the forests, and of the policy of the Forest Service in administering such agricultural areas as do occur. I find

that the large bodies of agricultural land have been eliminated in the recent boundary work. If other large bodies are found, our officers will present them for elimination. The agricultural lands which remain in the forests are scattered areas occurring as described in the earlier part of this statement.

It is the policy of the Service to open for settlement those agricultural areas which may be found here and there in the forest. It is our emphatic belief that it is of great value to the country to have settlers in the forests, and also that it is of the greatest advantage in protecting and administering the forests. Congress has provided a way for settlers to secure such areas, by the Forest Homestead Act of 1906. The object of this act was to enable settlement without making an elimination from the forest by presidential proclamation.

The criticism is then brought up that, as the law is administered, there are such difficulties and delays in the listing of lands as to discourage settlers, and that in effect the forests retard settlement in spite of the Forest Homestead Act. A number of instances of delay have been brought to my attention. In answer, I can only say that we are doing everything in our power to reduce all delays and to make the time between application and opening of land to entry just as short as possible. Since the establishment of a local district administration a year and a half ago, there has been a great change in the facilitation of this and other business on the forests. Our special effort is and will be to handle this matter with a degree of efficiency which will prevent any hardship on the part of the settler.

Still another criticism which has been brought against the Forest Service is that certain areas of agricultural land are withdrawn for administrative sites, and that these are therefore excluded from homesteading. The proper administration of the forests requires that rangers and guards be stationed at convenient points in the forests. This is important not only in order that they may

reach the difficult parts of their ranges for fire patrol, but in order that they may be readily accessible for the conduct of local business.

As conditions justify it, the number of rangers will have to be increased. In my judgment, the area now in charge of a single man is too large, and it certainly will not be many years before the size of the ranger district must be reduced. It would be an exceedingly shortsighted and unbusiness-like policy to ignore the future requirements of administering these great forests. I certainly shall not permit myself to be guilty of imagining that conditions are going to remain exactly as they are to-day. Certain areas have been withdrawn for ranger stations and some are not now used. I shall not make any change in any given case until I am perfectly certain that it will not be required for the proper protection and administration of the forest.

In conclusion, let me repeat that I believe that the criticism of the government's policy of agricultural settlements in the national forests has been largely based on a lack of thorough understanding of the conditions and the policy of administration. Settlement should be encouraged on the lands more valuable for agriculture than for other uses, and it is our aim to administer the Forest Homestead Act to accomplish this.

When I get on the ground with different men who have questioned our policy I find that there is little difference of opinion as to what is really cultivable land. I do not find any dispute regarding lands covered with valuable timber. I do not believe that there is much question regarding areas withheld for reservoirs or other public purposes.

I am confident, therefore, that with the co-operation of the users of the forests, which we are already receiving so largely, the matter of agricultural settlement, as other administrative matters in the forests, can be worked out to the best permanent advantage of the local communities of the state and of the nation.



CORRESPONDENCE

The Problem of Public Pasture

A Pioneer's Plea

THE pioneer lays foundations. He is the architect of the building to be. Here in the Sierra National Forest, where I live, the conditions that surrounded the pioneer still appeal to me. I understand in some degree the pioneer's plea for free grass, as of yore. I will state it once for all:

The settler came from Great Britain with the common-law right of feeding off the public pasture, "the commons," that lay near by him. No legislative body has repealed the common law of public pasturing of the waste lands of the United States. After two centuries of unbroken custom, until quite recently, he has come to regard his right to run his stock free on the outlying range as a vested right. In the rugged, broken mountain country, scarcely a claim could be found on which the homesteader could hope to make a living. He needed the grasses on the waste land around, as much as he needed the bubbling branch that threaded its way through his homestead. If he was to subsist on his 160 acres, the herbage of the solitudes adjoining was as much appurtenant as was the water. The government, when patent was issued to him, was fully aware of his environment, that he could not live without the forage of the surrounding fastnesses. And now, since more people must live here, and since the range is more or less exhausted, it seems shameful that conditions must be made harder as they naturally tend to grow worse.

Here in California, the owner of the hacienda let his cattle roam at large on the vast expanse of Mexican public lands. It was his right, and never questioned. Under the treaty of Queretare the right to free use of the public range passed to the people of California, as former Mexican subjects.

A well regulated pasturing of the forest land is a necessity. The herbage must be cropped off as a prudential and protective measure; otherwise the grass, drying, makes a great tinder-box to destroy the growing timber when the flames sweep the curtained hills. Horse and cow do a work the ranger cannot. They are among the greatest public benefactors of the national forest. Why should the owner of stock be fined for what they do, since no other class of property does so much to save the forest?

By reason of alleged concurrent jurisdiction of the federal and local governments, the forest authorities pay one-fourth of the receipts from timber sales and from grazing permits in each county into the county treasury. Thus the settler who has paid the county tax on his stock finds that a part of his permit fee goes into the county treasury, also, and there reduces, however little it may be, the amount of tax necessary to be paid by each of his fellow-citizens. The stock raiser objects to paying permit money either for national or county revenue. He affirms that such a method of raising revenue is unconstitutional; that taxation is cause, and revenue, effect; and that raising revenue without one's consent in any other manner than by taxation is an invasion of the citizen's private rights.

The public land was withdrawn from entry for the purpose of conserving the forest and for the maintenance of a continuous flow of water. The wood and the water are the two primary natural resources of the national forests. The timber, when ripe, is sold. The large lumber companies, outbidding the small mill men, buy the government stumpage, then reserve their own holdings, and thus control the lumber market. They can assess the stumpage upon the consumer, and hence lumber is dearer than ever before. These large lumber interests follow the co-operative methods of "big business;" that is, they enjoy a monopoly of the lumber trade consequent upon the corporate ownership of modern machinery. But the stock raiser is o'd-fashioned. He competes with his fellows. Competition makes it impossible for him to recoup himself and assess permit fees upon the consumer, as the lumber interests can do in the matter of stumpage expenditures. The net price of beef cattle is now twenty-five per cent lower than it was a few years ago. So it does not seem fair to argue that the blade of grass as a secondary natural resource for the conservation of which no appropriation has ever been made, should be held for a consideration in the same way as the giant pine.

The free use of water, however, is claimed by the water trust, that schemes to control the power of the future. Why should poor settlers in pastoral regions, twenty-four out

of twenty-five of whom are not able to cash their store bills, and half of whom are unable to raise their mortgages, be made to raise revenue to maintain the continuous flow of free water for the machinery of monopoly?

The fact that forestry is stunted by niggardly appropriations is greatly to be regretted, but is no argument why the stock raiser should be forced to pay an unconstitutional and unreasonable portion of the public revenue.

AARON W. FREDERICK, A.M.

North Fork, Cal.

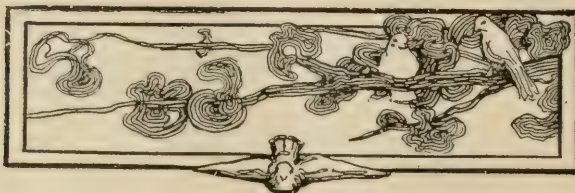
(The main emphasis is laid, in this communication, upon three points. It is urged that the grazing charge is illegal; that it works injury to the forest; and that it subjects the owners of stock to unreasonable and exceptional hardship. But in conceding the dependence of the stock owner upon the public range, and admitting the need of regulation, the writer surrenders his position at the outset, the legality of the charge being accepted as established. It is because the summer range in the national forests is vital to the maintenance of the live stock industry in the west, and because the range, as the writer concedes, "is more or less exhausted," while "conditions naturally tend to grow worse" for the stock men, that regulation in their interest became urgently necessary. All the rest of the present system of range management within the national forests follows as a corollary from this conclusion. Grazing fees are charged not as a source of revenue, but in order to raise a fund for administration purposes, for the progressive improvement of the range, and for the protection of grazing interests. It was not the existence of concurrent jurisdictions which resulted in the payment, under the present law, of twenty-five per cent of the gross proceeds of national forest business to the states in which the business was done, but the need of providing a substitute for county tax incomes when land was withdrawn from settlement to create the forests.

It is felt that the weakness of the correspondent's position is especially shown by his references to the use of timber and of

water-power sites. National-forest timber is not disposed of to applicants who are known to be seeking public stumpage in order to withhold their own timber for speculative advances to be obtained by monopoly when the public timber shall have been cut to the safety limit. But if the national forests had not been created the whole of the western forest would have fallen in time into the hands of the big interests, against which the consumer would not then have had the protection that he now enjoys by virtue of the existence of a competitive supply in the public forests.

With the water powers the situation is similar. It is through no fault of those who would anticipate and prevent the monopoly of water-power sites that such ominous progress has already been made toward monopoly. The water-power companies have fought a conservation charge for the use of power sites in the national forests and so brought about this menacing state of affairs; and their arguments in justification have been based on the very line of reasoning along which the writer of this communication advances against the only sort of regulation that really regulates—namely, an equitable charge for the use of public property for private profit.

Finally, if the small stock owner is to have fair play in competition with the large stock interests, the range can no longer be left to free competition, because conditions have so changed that "free competition" is the best ally of tyranny and numbers against weakness. The theory that might makes right on the range is contrary both to sound economics and to the square deal. As things were going, there would very soon have remained neither freedom of the range nor, indeed, the range itself. And the brightest side of the whole matter is that the stock men who were suffering under the old régime of oppression are finding their lost opportunity under regulation; while the chief protestants against the new range democracy are the illegitimate monarchs of the range, whose title rests upon the conquest not of stubborn nature, but of weaker competitors crowded out in the fight for a foothold.—Ed.)



STATE FOREST OFFICERS

Important changes have taken place during the past year in both the organization and the personnel of the state forest departments, and similar changes are taking place constantly. In order to record the progress made, as well as to invite corrections and make the list complete and accurate, a table of state forest officers, with their titles and addresses, is printed below:

STATE FOREST OFFICERS

State or territory	Name and post-office	Official position
Alabama.....	John H. Wallace, Jr., Montgomery.	Commissioner, department of game and fish.
California.....	G. M. Homans, Sacramento.....	State forester.
Connecticut.....	S. N. Spring, New Haven.....	State forester.
Hawaii.....	Ralph S. Hosmer, Honolulu.....	Superintendent of forestry.
Indiana.....	Charles C. Deam, Indianapolis....	Secretary, state board of forestry.
Iowa.....	G. B. MacDonald, Ames.....	Forester, agricultural experiment station.
Kansas.....	Chas. A. Scott, Manhattan.....	State forester.
Kentucky.....	M. C. Rankin, Frankfort.....	Commissioner, department of agriculture, labor and statistics.
Louisiana.....	F. J. Grace, Baton Rouge.....	State forest commissioner.
Maine.....	Edgar E. Ring, Augusta.....	Land agent and forest commissioner.
Maryland.....	F. W. Besley, Baltimore.....	State forester.
Massachusetts...	F. Wm. Rane, Boston.....	State forester.
Michigan.....	{ Marcus Schaef, Roscommon.....	State forester.
	{ Filibert Roth, Ann Arbor.....	State forest warden.
Minnesota.....	Gen. C. C. Andrews, St. Paul....	Forestry commissioner.
Montana.....	Charles W. Jungberg, Helena....	State forester.
New Hampshire...	E. C. Hirst, Concord.....	State forester.
New Jersey.....	Alfred Gaskill, Trenton.....	Secretary, forest park reservation commis- sion, and forester.
New York.....	{ James S. Whipple, Albany.....	Commissioner, forest, fish and game com- mission.
	{ C. R. Pettis, Albany.....	Superintendent of state forests.
North Carolina..	J. S. Holmes, Chapel Hill.....	Forester.
Ohio.....	Edmund Secrest, Wooster.....	Forester, state agricultural experiment sta- tion.
Oregon.....	{ J. W. Baker, Cottage Grove.	Forestry, fish and game warden.
	{ A. B. Wastell, Portland.....	Secretary, state board of forestry.
Pennsylvania....	Robert S. Conklin, Harrisburg...	Commissioner of forestry.
Rhode Island....	Jesse B. Mowry, Chepachet....	Commissioner of forestry.
Tennessee.....	H. A. Morgan, Knoxville.....	Director, college of agriculture and ex- periment station.
Vermont.....	Austin F. Hawes, Burlington....	State forester.
Virginia.....	G. W. Koiner, Richmond.....	Commissioner, department of agriculture and immigration.
Washington...	{ R. W. Condon, Port Gamble.....	Chairman, state board of forest commis- sioners.
	{ J. R. Welty, Olympia.....	State firewarden and forester.
West Virginia...	A. B. Brooks, Morgantown.....	State forester.
Wisconsin.....	Edward M. Griffith, Madison....	State forester.

STATE FORESTRY ORGANIZATIONS

A list of state forestry associations and their secretaries is printed below. Corrections in this list will be carefully recorded by AMERICAN FORESTRY.

Name of organization	Secretary	Address
Appalachian Mountain Club.....	R. B. Lawrence.....	Tremont Bldg., Boston.
Arizona—Salt River Valley Water Users' Association.	Charles A. van der Veer..	Phoenix.
California—Water and Forest Association...	I. C. Friedlander.....	1405 The Merchants Exchange Bldg., San Francisco.
Forestry Educational Association.....	E. C. Damon.....	San Diego.
Sierra Club.....	William E. Colby.....	San Francisco.
Pacific Coast Forest, Fish and Game Association.	Wm. Greer Harrison...	San Francisco.
Tri-counties Reforestation Committee.....	Miss L. A. Finch.....	Riverside.
Colorado Forestry Association.....	Ellsworth Bethel.....	Denver.
Connecticut Forestry Association.....	F. H. Stadtmüller.....	Elmwood.
Georgia Forestry Association.....	Alfred Akerman.....	Athens.
Iowa Park and Forestry Association.....	Welsey Greene.....	Des Moines.
Maine Forestry Association.....	Edgar E. Ring.....	Augusta.
Massachusetts Forestry Association.....	Irving T. Guild.....	4 Joy St., Boston.
Michigan Forest Association.....	H. G. Stevens.....	25 Band Chambers, Detroit.
Minnesota State Forest Association.....	E. G. Cheyney.....	St. Anthony Park.
Nebraska Park and Forestry Association...	Miss Leila B. Craig....	York.
New England Forest, Fish and Game Association.	Arthur T. Harris.....	16 State St., Boston.
New Hampshire—Society for the Protection of New Hampshire Forests.	Allen Hollis.....	Concord, N. H.
New York—American Forest Preservation Society.	Geo. Milroy Bailey....	Corfu, N. Y.
Forestry, Water Storage and Manufacturing Association of the State of New York.	Chester W. Lyman.....	1 Broadway, New York.
Northern New York Forestry Association..	O. B. Trappan, Director.	Potsdam, N. Y.
State of New York Fish, Game and Forest League.	L. C. Andrews.....	Elmira.
The Association for the Protection of the Adirondacks.	Edward Hagaman Hall.	Tribune Bldg., New York City.
North Dakota State Sylvaton Society.....	Miss Ella J. Mitchell...	Penn.
Ohio—Cincinnati Forest and Improvement Association.	Adolph Leue.....	127 West Twelfth St., Cincinnati.
Ohio State Forestry Society.....	Prof. J. J. Crumley....	Wooster.
Oregon Conservation Association.....	A. B. Wastell.....	904 Lewis Bldg., Portland.
Pennsylvania—Franklin Forestry Society...	W. G. Bowers.....	Chambersburg.
Pennsylvania Forest Association.....	F. L. Bitler.....	1012 Walnut St., Philadelphia.
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OCTOBER

1910

The Second National Conservation Congress

By E. A. START

THE PROTECTION OF FORESTS FROM FIRE

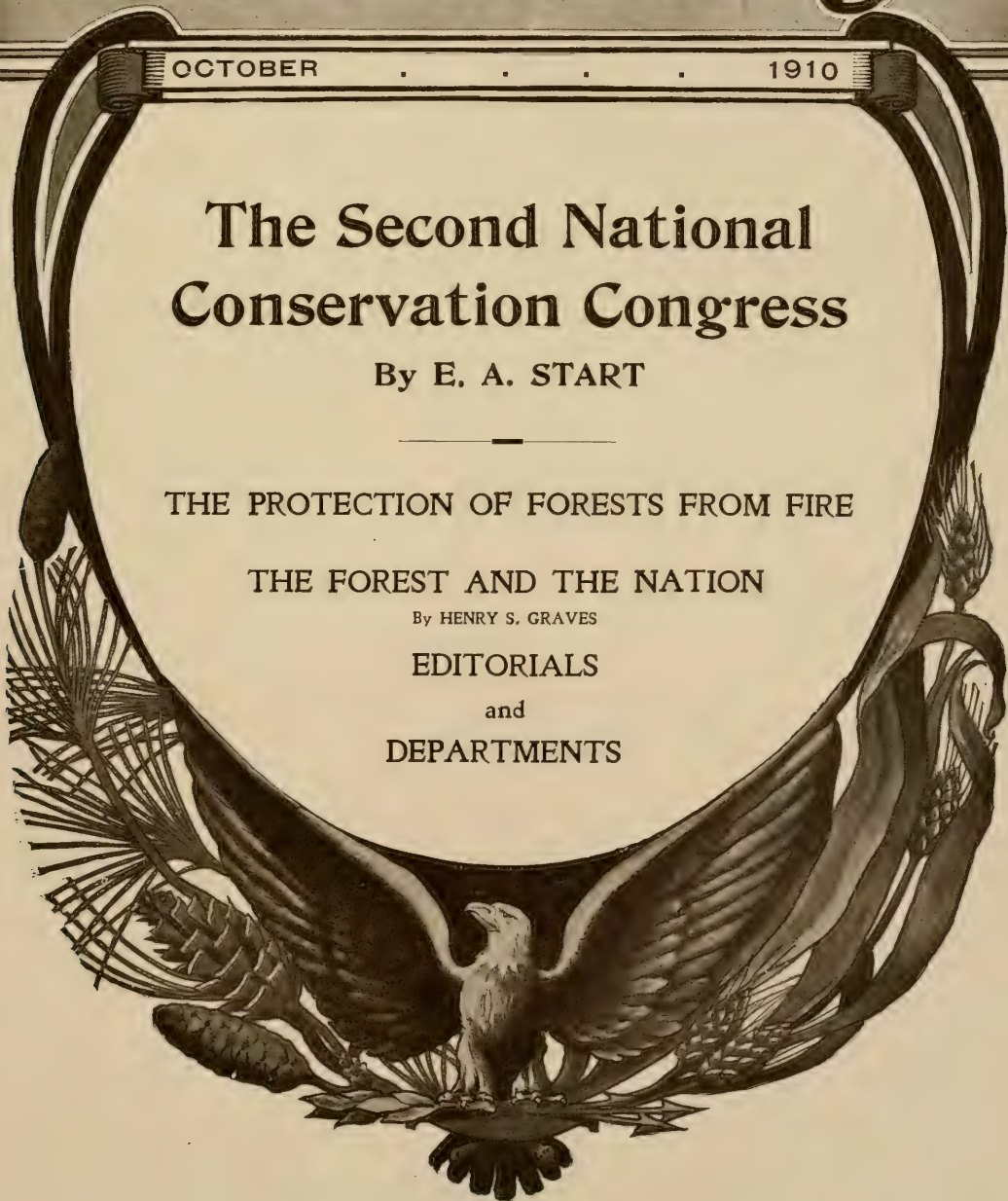
THE FOREST AND THE NATION

By HENRY S. GRAVES

EDITORIALS

and

DEPARTMENTS



The South's Grand Old Trees Need the Davey Tree Experts

No portion of the country has more beautiful trees than the Southland, and nowhere are trees more loved and prized. Although in far too many cases neglected and decaying, the majestic trees of the South respond quickly to treatment at the hands of experts. The accompanying picture shows trees typical of the section, after treatment by a corps of Davey men, on the home grounds, at Magnolia Villa, of Mayor George W. Tiedeman of Savannah, Georgia. The general satisfaction afforded tree owners in the South by the Davey service is well expressed by Mr. A. G. Campbell, president First National Bank, of Natchez, Mississippi:

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October

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Indexes for Vol. XV (1909) are ready and may be had on application

The American Forestry Association

is a national organization composed of public-spirited citizens who are interested in the prevention of the wholesale destruction of our forests, in forest extension and utilization, and in the fullest cooperation of national, state, municipal, and private agencies for these purposes. The Association has no business or governmental ties or alliances. Its work is to educate the people to know and understand the value and necessity of forests in the Nation's life and the way to maintain them to the best advantage through scientific forestry; and to bring about such wise legislation as will best secure the desired results. It is the people's forestry advocate and the representative of forestry before the people.

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MAGAZINE DEPARTMENT.—This department publishes **American Forestry**, the only popular monthly magazine of national circulation in its field. It has a strong force of editors and contributors and is well illustrated. The subscription price is *two dollars* a year.

EDUCATIONAL DEPARTMENT.—Series of educational and general bulletins and leaflets will be issued at intervals. These will be sent to all members and will be provided for distribution at a nominal cost. The first numbers of the general series are a brief summary of the history and need of the project for National Forests in the southern Appalachian and White mountains; the record of the vote on the Weeks bill, looking to that end, in the Sixtieth Congress; and a part of the argument for the Appalachian forests by the President of the Association, Hon. Curtis Guild, Jr., in his annual address for 1910.

LECTURE SERVICE.—It is proposed to establish a lecture service through which reliable lecturers upon forestry subjects may be obtained. This bureau will arrange with able lecturers at central points who will be available for lectures, with illustrations if desired, before clubs, associations, boards of trade, or general audiences.

CORRESPONDENCE BUREAU.—Through this bureau the Association will furnish information on forestry when possible and provide advocates of the cause with material.

LEGISLATION DEPARTMENT.—As it has always done, the Association will use the agencies at its command to secure the passage of wise legislation in furtherance of its great purpose. Its national character and the location of its main office in Washington enable it to keep in close touch with national legislation and it will cooperate, when practicable, with forestry workers in the several states to promote good state legislation. Its first and most important object in legislation is the passage of a measure for the creation of National Forests, with especial reference to the southern Appalachian and White mountains.

The development of these lines of work to their highest usefulness requires the maintenance of a considerable staff and an expensive plant. Contributions for the work, or for any particular phase of it, are always welcome. The income of the Association by which its general work is supported is derived from membership fees, which are as follows: **Annual members, one dollar yearly; contributing members, ten dollars yearly; sustaining members, twenty-five dollars yearly; life members, one hundred dollars, and patron members, one thousand dollars**, the two latter being exempt from further payments.

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Application for Membership

To EDWIN A. START

Secretary American Forestry Association

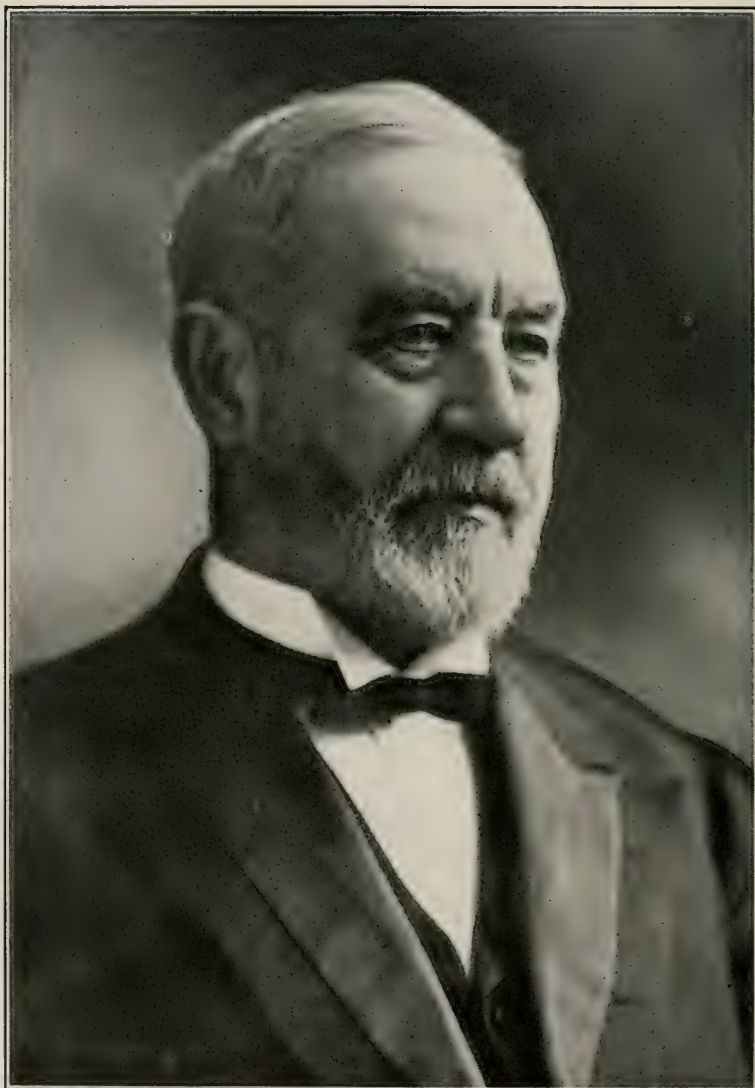
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Dear Sir: I hereby signify my desire to become a member of the American Forestry Association. One dollar (\$1.00) for annual dues is enclosed herewith.

Very truly yours,

Name _____

P. O. Address _____



HENRY WALLACE

Editor of Wallace's Farmer and President of the Third
National Conservation Congress

American Forestry

Vol. XVI

OCTOBER, 1910

No. 10

THE SECOND CONSERVATION CONGRESS

A Great National Assembly in St. Paul, September 5 to 8

By EDWIN A. START

THE four days from the fifth to the eighth of September will be memorable in the history of the city of St. Paul and in that of the nation for the notable gathering brought together in the Minnesota capital by the sessions of the Second National Conservation Congress. There were present for a part or all of the time the President and ex-president of the United States, the Secretary of Agriculture, the veteran John W. Noble, secretary of the interior under President Harrison, Senators and Representatives, governors and ex-governors, officials of state and nation, scientific experts representing the leading technical and scientific organizations of the country, also several politicians and representatives of special interests. Incidentally it may be noted that forestry and lumbering had the largest representation of any phase of conservation, a new demonstration of the fact that here is to be found the real backbone, as well as the beginning of the whole movement. Such a gathering as this could not but be full of interest to any live American; nor could its discussions and its thousand outside conferences fail to be of value to the nation, for this was a truly representative body.

There was perhaps too much oratory and too little practical discussion of ways and means by the men who know. This is an almost universal fault of conventions of this kind, where the program is packed too full of heavy speeches, many of them by men who are considered for their value as attractions rather than as teachers. There was an unusually large body of keen, informed, working conservationists present at this convention to have filled out an admirable program of practical discussion if they could have been heard, but the crowded program did not allow much time for this. Furthermore, the temper of the majority of the congress was such that open discussions would have been preferred and would have held the delegates much more closely than the flights of political oratory which were so generously provided. There was widespread disappointment among the delegates that the congress did not more closely keep to its promise to discuss the actual business of conservation, rather than to declaim upon its general principles.

Having made this criticism, it is fair to say that the congress made real progress toward an understanding of its subject and the way to handle it and



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WILLIAM HOWARD TAFT

that the net result of this national conversation on conservation will be beneficial. The committee on resolutions was successful in constructing a very good working platform. The unfortunate and for the most part useless war of words on the outworn state rights issue probably convinced no one, but it afforded a safety valve for certain pent up feelings and may help to clear the air. Many of the speakers, beginning with the President, had well thought out messages which were good to hear and will make useful reading.

The first two days of the congress were given chiefly to the President, the ex-president, and the governors. The first address at the opening session on Monday morning was by Governor A. O. Eberhart of Minnesota and it set a

good keynote both in matter and manner. He spoke with comparative brevity, showed the significance of the conservation movement in general, and especially in its relation to agriculture, and reviewed particularly the resources and work of Minnesota. He urged the establishment by all the states of conservation commissions, having power to deal with all the problems of natural resources.

There was an address of welcome by Mayor Keller, of St. Paul.

Incidentally it may be noted that we learned at this congress that the Union is made up of forty-six states, each one of which is the finest and richest section of the earth. State pride was constantly on tap throughout the sessions.

THE ADDRESS OF PRESIDENT TAFT

President Taft was received locally and by the congress with all the respect due to his great office and to his own likable and dignified personality. His address made a strong and favorable impression. Many who came to criticize remained to praise and there is no doubt that the President made friends by it. He did not minimize the importance of the occasion, or the greatness of the opportunity. His enunciation of his conservation policy was carefully made and forcefully and judicially stated. It showed a broad and impartial study of the subject. There was in it no play to the galleries. It was plainly a great effort by a sincere man to square himself before the country upon one of its chief issues. It was a weighty state paper addressed to the people of the United States.

"Conservation," the President said, "as an economical and political term, has come to mean the preservation of our natural resources for economic use so as to secure the greatest good to the greatest number." He briefly reviewed the development of the country which has made the issue of conservation acute and, referring to the need for some one to arouse the country to a sense of the conditions, he made a fine

reference to his predecessor. "Theodore Roosevelt," he said, "took up this task in the last two years of his second administration and well did he perform it. As President of the United States I have, as it were, inherited this policy and I rejoice in my heritage. I prize my high opportunity to do all that an executive can do to help a great people realize a great national ambition." Conservation he declared to be a national question and not one of politics, of factions, or of persons, and he added that "a satisfactory conclusion can only be reached promptly if we avoid acrimony, imputations of bad faith and political controversy."

The President summarized briefly the statistics of the public domain and classified his discussion under six heads, (1) agricultural lands; (2) lands containing metalliferous minerals; (3) forest lands; (4) coal lands; (5) oil and gas lands, and (6) phosphate lands.

Our land laws for the entry of agricultural land, including the original homestead law, the enlarged homestead act, the desert land act, the donation or Carey act, and the national reclamation homestead law he considered to have worked well and to need no radical reform. He reviewed favorably the



Gov. A. O. Eberhart of Minnesota

achievements of the Reclamation Service, but did not favor the proposal to have the United States aid in the drainage of swamp lands belonging to states or private owners. He did not think it wise to change the statutes relating to mineral lands.

With the national forest policy he dealt at some length, reviewing its main features. He demanded that the states should act more effectively in the prevention of forest fires and concluded this section of his address by saying, "I have shown sufficiently the conditions as to the federal forestry to indicate that no further legislation is needed at the moment, except an increase in the fire protection of the national forests, and an act vesting the executive with full power to make forest reservations in every state where the land is timber covered or where the land is needed for forestry purposes."

Discussing the subject of coal, oil, gas and phosphate lands, the President came to the general conclusion that such land should be held by the government and leased for development under terms which would compel the opera-

tors to provide for the safety of individuals and for the national interest. His recommendations on these points were evidently the result of thorough study and of very definite judgment. He reviewed the Alaskan situation and the history of the Cunningham claims and said that the government has much to answer for in not having given proper attention to the government of Alaska and the development of her resources, and that "the problem of the disposition of the coal lands for present and future use can be wisely and safely settled in one session, if Congress gives it careful attention."

On the subject of water power sites the President's position was not so positive. He described what had been done in the way of withdrawals for the protection of such sites, stated with great care and fairness the arguments for and against national and state control, and declined to express an opinion upon the controversy or a preference as to the method of treating water power sites. He said that he should submit the matter to Congress and urge that one or the other of the two policies be adopted. Naturally this balanced judgment on the subject that has aroused so much controversy did not please either the advocates of national or of state control.

The President's closing words to the congress were wise and forceful. He pointed to the heavy responsibility which rests upon states and individuals as well as upon the federal government in the matter of conservation, and continued:

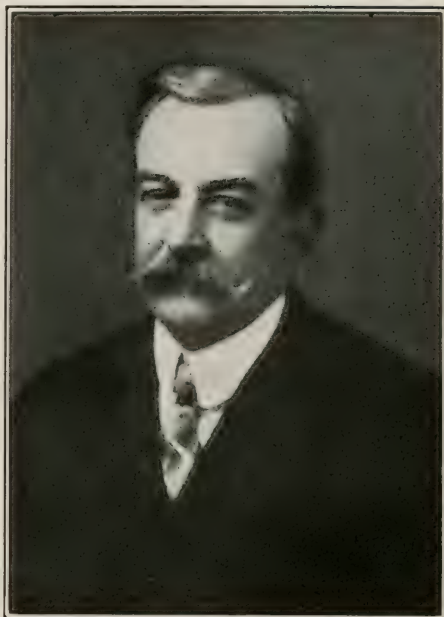
"I am bound to say that the time has come for a halt in the general rhapsodies over conservation, making the word mean every known good in the world; for after the public attention has been aroused, such appeals are of doubtful utility and do not direct the public to the specific course that the people should take, or have their legislators take, in order to promote the cause of conservation. The rousing of emotions on a subject like this, which has only dim outlines in the minds of the people affected, after a while ceases to be useful, and the whole movement will, if promoted on these lines, die for want of practical direction and of demonstration to the people that practical reforms are intended."

He said that the withdrawal of Government lands from entry were only one necessary step and should not be regarded as final:

"The idea should not be allowed to spread," he declared, "that conservation is the tying up of the natural resources by the government for indefinite withholding from use and the remission to remote generations to decide what ought to be done with these means of promoting present general human comfort and progress. For, if so, it is certain to arouse the greatest opposition to conservation as a cause, and if it were a correct expression of the purpose of conservationists it ought to arouse this opposition.

"Real conservation involves wise, non-wasteful use in the present generation, with every possible means of preservation for succeeding generations; and though the problem to secure this end may be difficult, the burden is on the present generation promptly to solve it and not to run away from it as cowards, lest in the attempt to meet it we may make some mistake. As I have said elsewhere, the problem is how to save and how to utilize, how to conserve and still develop; for no sane person can contend that it is for the common good that nature's blessings should be stored only for unborn generations.

"I beg of you, therefore, in your deliberations and in your informal discussions, when men come forward to suggest evils that the promotion of conservation is to remedy, that you invite them to point out the specific evils and the specific remedies; that you invite them to come down to details in order



B. N. Baker, President of the Congress

that their discussions may flow into channels that shall be useful rather than into periods that shall be eloquent and entertaining, without shedding real light on the subject. The people should be shown exactly what is needed in order that they make their representatives in Congress and the state legislature do their intelligent bidding."

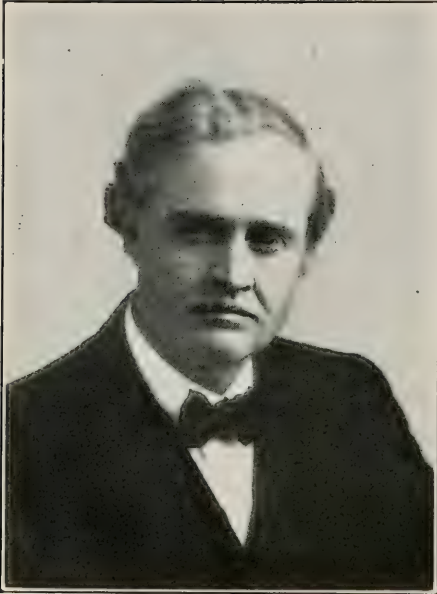
THE GOVERNORS' SESSION

At the afternoon session on Monday Senator Nelson was the first speaker, his subject being the "Public Land Laws of the United States." He made an exhaustive and valuable review of this complex subject. He referred to Gifford Pinchot as the father of our forestry system. On the vexed question of control of water power sites, after alluding to the difficulty arising from divided jurisdiction, the senior senator from Minnesota offered this solution:

"It seems to me—but perhaps I may err—that the problem of developing and utilizing water power in such cases can only be properly solved by the co-operation of the state and the federal government. The one owning the power site and the other the water in the stream, it strikes me that co-operation in such a case is essential, and

furnishes the only practical solution. And some plan should be devised by which the federal and state governments could act in harmony and unison in such cases. Of course, when the state owns both the water and the power site, the problem is of a less complex character, and is one exclusively for the state to solve, except as to the question of navigation. It may be added in this connection that Congress at the last session passed a general law to regulate the construction of dams across navigable waters, by which provision is made for protecting the interests of the federal government in such cases."

The remainder of Monday afternoon was turned over to the governors, Governor Stubbs, of Kansas, presiding. The Kansas executive is a personality, abrupt, good-humored, aggressive, the embodiment of insurgency, and an unqualified supporter of Theodore Roose-



Gov. W. R. Stubbs of Kansas

velt and Gifford Pinchot. He intimated once or twice during the afternoon that this session was to give some of these governors a chance to relieve their minds, after which the congress could get down to business.

Governors Hay, of Washington, Norris, of Montana, and Brooks, of Wyoming, had come from the recent conference at Salt Lake City prepared to insist upon state control of natural resources and full of fight because they had not the opportunity they desired on the program. This session therefore gave them their only real opportunity.

The first speaker was Governor Noel, of Mississippi, and he declared on behalf of his state: "We stood for state rights; we are for state rights still; but we know that our only rights as states are through the federal government." He said further: "We stand for conservation of natural resources by all government agencies, state and national, that will preserve and protect them for the use of the whole people."

Governor Norris, of Montana, claimed that his state originated conservation legislation but to prove this he had only to show a land law of 1908. His cita-

tion of this showed that he has given little attention to the legislation of other states or of the nation. He also asserted that the first conservation commission, state or national, was appointed by him for the state of Montana. He then plunged into an impassioned defense of state rights, in the course of which he asked how, if Montana cannot be trusted to legislate for herself, a distant state like Maine can be trusted to legislate for her. This seems to an unprejudiced listener to beg the question. No one proposes that Maine or Florida shall legislate for Montana, but many people do propose that the Congress of the whole United States shall legislate for the protection of its own property and the interests of all of its people in every state.

Governor Deneen, of Illinois, expressed his sympathy with the western governors in their efforts towards the development of their own states, and gave it as his opinion that the national government should not interfere to prevent the development of these western states, but he also said that the national government should not allow the natural resources of the country to be wasted either through neglect or spoliation, and that neither must it be placed in a position where the legislatures of the various states can hinder its efforts toward conserving all the resources for all the people. The western states must and will work with the central government, for they each have interests that neither can make available without the other.

Then came another attack from the state rights side, by Governor Hay, of Washington. The governor charged with much show of feeling that his section would not have been allowed representation at this congress but for the action of the city of St. Paul. He sharply arraigned the government's forest policy of his state as bad for the poor settler. He said that in the conservation movement common sense had given place to humbug, and fairness to intolerance. He attacked the attempt of the federal government to gain control of water powers by indirection, a

policy supported, he said, by the National Conservation Association, "an organization which is already quarreling within itself over the orthodoxy of its own members."

Governor Brooks, of Wyoming, spoke along the same line and read the resolutions of the conference of governors of the Pacific Coast and Rocky Mountain states at Salt Lake City, August 18-19.

At this point Governor Stubbs, rising to introduce Governor Vessey, of South Dakota, broke into a passionate reply to the northwestern men. Governor Vessey took a moderate position recommending a national commission to settle conservation questions.

Thus the gauntlet was thrown into the ring and this old political issue, revamped for a new purpose, became a subject of discussion in the the congress. The gauge was taken up at different times by Colonel Roosevelt, Senator Beveridge, ex-Governor Pardee, ex-Governor Blanchard, and others.

There was no question as to how the congress, by a large majority, stood upon it; it was for national control by an overwhelming majority, and it believed, rightly or wrongly, that the strong sentiment in certain western states has been worked up by interests that believe they can control the state governments more easily than they can the national government. The Oregon delegates did not join their neighbors on this issue, but voted to stand by the principle of national control. There was also a revolt among the members of the Washington delegation who were not appointees of Governor Hay. Two or three of them when opportunity offered denied on the floor of the congress that Governor Hay and his delegates fairly represented their own state. At a later session ex-Governor Pardee announced that he had messages stating that the state granges of Washington and the labor unions did not endorse Governor Hay's position.

MR. ROOSEVELT'S ADDRESS

Tuesday morning was all Roosevelt. The ex-president took St. Paul by storm. The Auditorium, seating ordinarily seven thousand people, was packed to the doors. There were probably ten thousand people in the hall when the great leader arrived, escorted by the uniformed Roosevelt Club and the reception committee. His reception, the culmination of hours of expectancy, was one of tremendous and unqualified enthusiasm, demonstrating anew his personal hold upon the hearts of the people of the whole country, who were so well represented in that notable assembly.

The address of Mr. Roosevelt complemented that of the President on the preceding day in a way most gratifying to those who wish to see accord between these two men who have been so intimately associated in the leadership of the nation. There was this difference, due to the difference both of tempera-

ment and circumstance. President Taft had placed himself definitely upon a national conservation platform, but he spoke with the judicial reserve characteristic of the man and fitting his heavy responsibility as the nation's chief executive. Colonel Roosevelt, always unconventional and forceful in his public utterances, plunged into his subject with the sledge-hammer force natural to him and with the freedom of a popular leader, untrammelled by official position. For the most part the opinions of the two distinguished speakers were in harmony. The keenest critic could find no fundamental difference. Colonel Roosevelt set forth as of right his convictions upon the great national issue which he as president had created and to which President Taft had with modest pride acknowledged his heirship and his steadfast adhesion.

Noting in his opening sentences the high efficiency of America under the old



THEODORE ROOSEVELT

methods of individual and corporate development, Mr. Roosevelt asserted that

"The method of reckless and uncontrolled private use and waste has done for us all the good it ever can, and it is time to put an end to it before it does all the evil it easily may. * * * Henceforth we must seek national efficiency by a new and better way, by the way of the orderly development and use, coupled with the preservation, of our natural resources, by making the most of what we have for the benefit of all of us, instead of leaving the sources of material prosperity open to indiscriminate exploitation."

He then took up the subject of inland waterways, which he described as one of the greatest of our conservation problems. He insisted that railways must not control water routes and that "adequate terminals properly controlled and open through lines by rail and boat are two absolutely essential conditions in the usefulness of any inland waterway development."

Of the question of drainage of swamp lands he said:

"Where the states are unwilling or unable to undertake it, the drainage of swamp and overflow lands by the Federal Government is a wise and necessary measure. Much of it must be done by the nation in any case, as an integral part of inland waterway development. It affords a most promising field for co-operation between the states and the nation."

He next referred to forest protection and forest extension, and in this connection he said: "The fight to create the Southern Appalachian and White Mountain forests in the East is not yet over. The bill has passed the House, and will come before the Senate for a vote next February. The people of the United States, regardless of party or section, should stand solidly behind it, and see that their representatives do likewise."

He urged the need of forest protection as shown by the recent western fires and noted the comprehensive character of the tasks of the Forest Service, closing this section of his address with the statement, "I think that hereafter we may safely disregard any statements that the National Forests are withdrawn from settlement and use."

The importance of a study of country life with special reference to better living on the farm and to better business on the farm was strongly presented, and Mr. Roosevelt in this connection recommended the establishment of a country life museum at Washington similar to the admirable institution in Buda-Pest, the capital of Hungary. He also advocated the establishment of a federal bureau of health and paid his respects to Representative Tawney, of Minnesota, for his work in cutting off support from the conservation and country life commissions appointed during Mr. Roosevelt's administration as president. He said that he signed the sundry civil bill containing the Tawney amendment under protest, because it was an unconstitutional invasion of the executive power, and that if he were to have remained president he would have paid no attention to it whatever.

The need of conservation of natural resources among our neighbors on the north and south, and the duty of this country to give them every assistance possible was alluded to, and Mr. Roosevelt then took up the question of water powers. Upon the question of state or national control he said:

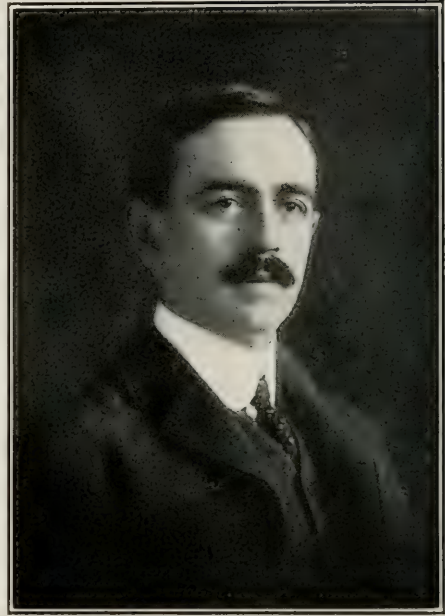
"There is apparent to the judicial observer a distinct tendency on the part of our opponents to cloud the issue by raising the question of state as against federal jurisdiction. We are ready to meet that issue if it is forced upon us. But there is no hope for the plain people in such conflicts of jurisdiction. The essential question is not one of hair-splitting legal technicalities. It is simply this: Who can best regulate the special interests for the public good? Most of the predatory corporations are inter-state or have inter-state affiliations. Therefore they are largely out of reach of effective state control, and fall of necessity within the federal jurisdiction.

"One of the prime objects of those among them that are grasping and greedy is to avoid any effective control either by state or nation; and they advocate at this time state control simply because they believe it to be the least effective. In the great fight of the people to drive the special interests from the domination of our government, the nation is stronger and its jurisdiction is more effective than that of any state. The most effective weapon against these great corporations, most of whom are financed and owned on the Atlantic coast, will be federal

laws and the federal executive. That is why I so strongly oppose the demand to turn these matters over to the states. It is fundamentally a demand against the interests of the plain people, of the people of small means, against the interest of our children and our children's children, and it is primarily in the interest of the great corporations which desire to escape all government control."

On the question of coal, oil and phosphate lands Mr. Roosevelt in definite terms endorsed the opinion expressed by the President in his address the day before. He also urged with emphasis, as did the President, the point that conservation does not propose to withdraw resources from use, summing this up with the statement, "conservation is the road to national efficiency and it stands for ample and wide development."

He warned the congress against those who attend such gatherings ostensibly as disinterested citizens, but actually as paid agents of the special interests. He declared it to be our duty and desire to make this land a better home for the race and that we must also work for a better nation to live in this better land. "The homely virtues are the lasting virtues, and the road which leads to them is the road to genuine and lasting



Herbert Knox Smith, Commissioner of Corporations

success." His closing sentence was a challenge: "The supreme political task of our day, the indispensable condition of national efficiency and national welfare, is to drive the special interests out of our public life."

THE CONTROL OF MONOPOLY

Tuesday afternoon the Hon. John Barrett, of the Bureau of American Republics, presided. The first speaker was Miss Mabel Boardman, on the work of the Red Cross in the conservation of human life.

Herbert Knox Smith, commissioner of corporations, discussed the prevention of power monopoly, the chief conclusions of which in regard to the present condition of the hydro-electric industry he summed up as follows:

"First—It deals with a basic necessity and its importance inevitably increases as the fixed supply of other sources of power decreases.

"Second—Substantial control of mechanical power means the exercise of a function that is governmental in its effect on the public.

"Third—Driven by underlying economic and financial forces, concentration of control of water powers in private hands has proceeded very rapidly. It is doubtful if anything can arrest this process, and a swift advance to a far higher degree of concentration is entirely possible.

"Fourth—Any chance, then, of restraint by competition is rapidly disappearing, certainly over given sections, and public regulation is therefore an imminent necessity.

Arguing that the water power problem is a national one and that the scope of the federal jurisdiction is therefore of first importance, but that there must be co-operation between the nation and the state, each using their full powers, he said:

"Let there be no unnecessary hampering of hydro-electric development, but let the

public be in on the ground floor at the start, for at the start the public must grant the power and for all time the public will be the party chiefly interested in its use.

"Specifically:

"First—The status quo of powers still controlled by the nation or state should be maintained until we know what we have, and can act intelligently thereon.

"Second—No grant should be made except for a fixed period, with at least the reserved right to readjust terms at the end thereof. That period, however, should be long enough to permit adequate financing and complete development.

"Third—Complete publicity of accounts and transactions should be required as well as a record of cost, and the real relation of investment to stock and bond issues.

"Fourth—Power to revoke the grant for breach of conditions should be lodged in a specified authority. Otherwise there will always be the possibility of protracted litigation to determine the status.

"Fifth—So far as is possible, direct provision should be made against excessive charges and monopolistic abuse.

"Sixth—Public authorities should reserve such constitutional compensation or rental as will establish the principle of underlying public interest.

"Seventh—All public easements of navigation, fisheries, etc., should be safeguarded.

"Eighth—In the case of new grants, all these provisions should be made conditions of the grant.

"Finally, the purpose and probable effect on the public of any grant should first be fully ascertained and carefully considered, in order to determine whether public interest justifies beyond a reasonable doubt the surrender by the public of even a part of its power over this great public resource. Where reasonable doubt exists, the status quo should be maintained."

The next address of the afternoon was by James R. Garfield, former Secretary of the Interior, on the government's relation to conservation. This was an exceptionally able paper defining the general powers of the President and of the other executive officers, showing that the problem is not simply to distribute what remains of the public domain, but to do it so as to prevent giving the big special interests control over timber, water, fuel and phosphates. Hitherto, privileges and opportunities of great value have been given away, often illegally, and such frauds can only be prevented by vigorous executive action, the practical need of which, Mr. Garfield said, has been clearly shown in

public land matters. "Often the most perfect paper proof of claim covers the greatest violation of the law. The duty of the executive is neglected and the rights of the public jeopardized unless the spirit as well as the letter of the law is enforced."

Mr. Garfield denied that there had been any executive usurpation in recent years, as has been so frequently charged. "The courts are open to test such a case but none has been brought." He made this plain and emphatic declaration:

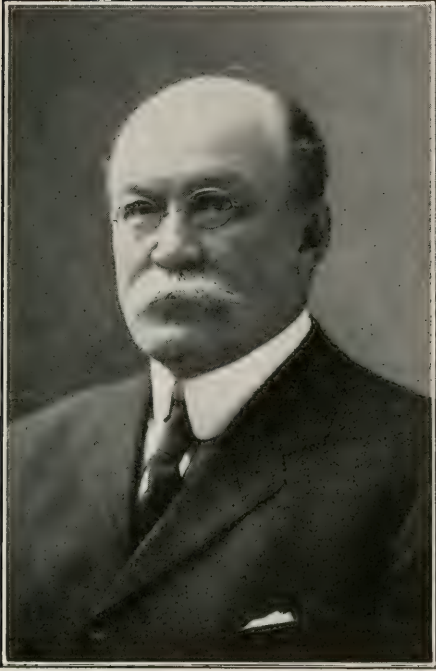
"The critics of honest, vigorous enforcement of the land laws, and the opponents of the measures proposed to improve the land laws, are not really interested in the abstract theory of executive power. They objected to the new order of things because it prevented them from stealing public lands."

One pregnant statement was that "the general welfare clause is not a mere phrase," and this he sustained by ample citations. Upon the question of state rights and the development of water powers, he said:

"Exactly as the cry of executive usurpation was raised, so now the ghost of states' rights is dragged out to frighten the public. There is no real conflict between nation and states in dealing with the public lands, and the use of natural resources. Each jurisdiction has great interests to safeguard, great duties to perform for the common good, and, whenever the jurisdictions overlap, neither should withdraw, but by co-operation provide for such regulation as will prevent private and special interests from escaping effective public regulation and supervision.

"For example, the proposition to transfer to the several states all public lands adapted to use for reservoir or dam sites is absolutely wrong. It is not an infringement of the rights of the states for the nation to keep and provide for the use of such lands, but would be a flagrant violation of duty if the nation gave away its power to safeguard the public interests against the aggression of the special interests that are seeking to control and monopolize the water powers of the country.

"The retention of such lands by the nation does not mean any improper retarding of needed development, but does mean that development shall be encouraged under conditions that will yield a just and ample profit to the private interest undertaking it, and at the same time yield fair compensation to the public, prevent extortion upon the consumer,



President W. W. Finley of the Southern Railway, a Vice-President of the American Forestry Association, who made an able address on "The South and Conservation."

and limit the term of the grant, thus prohibiting monopoly and leaving to the coming generations the chance to use this great natural resource—water—in accordance with their needs."

The discussion was opened by ex-Governor George C. Pardee, of California. Mr. Pardee was in very complete accord with the papers that had been presented. He referred to the way in which California had squandered its resources, and expressed a doubt whether there was anything left in California that the federal government had not nailed down which private and corporate interests have not stolen. He denied the rash statement made by Governor Hay, of Washington, Monday afternoon to the effect that in his arguments for state rights he represented 95 per cent. of the people of the Pacific Coast. Governor Pardee called attention to the state-wide primaries which had recently been held in California in which the chief issue was conservation and the Pinchot policies and they had carried by such a large majority that it

was perfectly evident that so far as California was concerned the people of the Pacific Coast did not follow Governor Hay. Governor Pardee's discussion was one of the strong addresses of the Congress. He was followed by ex-Governor N. C. Blanchard, of Louisiana, who, on behalf of his state, denounced the state rights theories of the northwestern governors, declaring that the South had settled that question many years ago, and regarded itself now as a part of a nation.

President W. W. Finley, of the Southern Railway, delivered one of the able and practical addresses of the congress at the Wednesday morning session. President Finley devoted much of his attention to the subject of forestry in the South and to the project for national forests in the southern Appalachians. His immediate subject was the interest of the railways of the South in conservation. He said that if the conservation of forests is to be done on a large scale it must be done by government agency. One of his most cordially appreciated statements was to the effect that whatever policy is in the best interests of the public is in the best interests of the railways, and vice versa.

Hon. Albert J. Beveridge, of Indiana, received an ovation from the audience on his arrival, and his address on "The Young Man's Idea," delivered with the senator's usual brilliant oratory, produced continued outbursts of enthusiasm. The greatest demonstration, however, followed his tribute to Gifford Pinchot. The storm of applause which broke forth at this point was equal, in proportion to the size of the audience, to the demonstration with which Colonel Roosevelt was received the day before. Mr. Pinchot was compelled to come forward from the rear of the platform and say a brief word or two to the audience after Senator Beveridge had closed. The senator said that "one great, good, pure, true and whole hearted young man has been for four years fighting for this national conservation idea, struggling to save for the people that which is their own—Gifford Pinchot."

Dr. Frank L. McVey, President of the University of North Dakota, discussed the important subject of rational taxation of resources. The discussion of this paper was led by Captain John B. White, of Kansas City, chairman of the executive committee of the National Conservation Congress.

Remarks were also made at this ses-

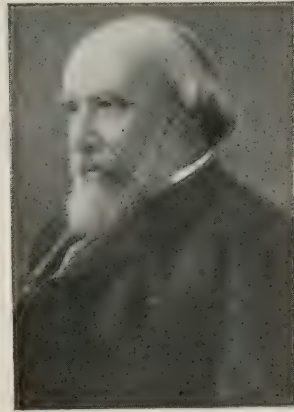
sion by Mrs. George O. Welch, of Fergus Falls, Minnesota, recording secretary of the American Federation of Women's Clubs; Mrs. Hoyle Tomkies, of Shreveport, Louisiana, president of the Woman's National River and Harbor Congress; Mrs. G. B. Sneath, of Tiffin, Ohio, and Mrs. J. C. Howard, of Duluth, Minnesota.

COUNTRY LIFE AND THE FARM

The opening address of the Wednesday afternoon session was by President Edwin Boone Craighead, of Tulane University, on the subject, "Making our People Count."

The reception accorded James J. Hill, who was the next speaker of the afternoon, showed his popularity in his own state. But the position taken by Mr. Hill in his address was not the orthodox position of the congress. Indeed, he seemed to give aid and comfort to the state rights advocates of the northwest. He covered some of the ground made familiar in other recent addresses by him, denouncing the growth of extravagance in the country, advocating intensive farming for the purpose of increasing crop production and preventing the exhaustion of the soil. He found the earliest conservation work in this country to be in the field of forestry. He declared that the end to which this congress should devote itself is to conserve conservation, adding "it has come into that great peril which no great truth escapes—the danger that lurks in the house of its friends. It has been used to forward that serious error of policy, the extension of the powers and activities of the national government at the expense of those of the states." He then criticised the work of the Reclamation Service on the ground that the government machine is too big and too distant and that it is therefore slow in operation. He charged that it was more expensive than private enterprise. He argued that coal and other mines must be worked on a large scale to make their operation commercially possible. He criticized the locking up of

the forest land of the West in national forests and said that the whole West rightfully protests against the withdrawal of water power sites and their leasing for the profit and at the pleasure of the federal government. In



President James J. Hill of the Great Northern Railway

order to show the inability of the national government to properly manage its land, Mr. Hill alluded to some of the extravagances and scandals in connection with the public lands, but failed to call attention to the fact that these were promoted by the local interests that were dominant in the several states. He urged the need of conservation of the soil, and presented statistics at considerable length to show that the favorable balance of our trade in food stuffs was disappearing. He denounced the tariff as a great enemy of conservation. He came back to the state rights issue, declaring that "experience proves that resources are not only best administered



Capt. J. B. White of Kansas City

but best protected from marauders by the home people who are most deeply interested and who are just as honest, just as patriotic and infinitely better informed on local conditions than the national government can possibly be." He closed with a statement of the moral issue involved in the principle of conservation.

The discussion of Mr. Hill's paper by Henry Wallace, of Iowa, the editor of *Wallace's Farmer*, was spicy and effective. Mr. Wallace asserted the national character of the possessions which the nation is now trying to conserve and which he declared it may justly refuse to sell. He questioned the correctness of Mr. Hill's deductions as to the cost of the reclamation service, calling attention to the fact that the government operations afford no opportunity for speculation in land while other propositions afford it abundantly. He spoke as follows of the possibility of the future:

"If our government is to continue as it has for some years past—a government by

great corporations for the benefit of great corporations—it matters little whether our resources are managed by Congress or by the several states. In either case they will be stolen and used to oppress our children and our children's children. But if in time to come it is to be really a government of the people by the people for the people, then the representatives of the people in Congress are the proper persons to prescribe the method by which our resources are to be conserved and utilized in the future. To say that this cannot be done as the nations of Europe do it, as Canada does it, as Australia does it, is to say that republican institutions are a failure. To even doubt that it can be done is infidelity to democracy, or government by the people, as distinct from an oligarchy or plutocracy, or government by great combinations of capital.

"It is not a little significant that the heads and representatives of all great corporations, so far as I have noticed, are in favor of the development of our remaining resources by the state governments. They are shrewd enough to see that the time is near at hand when those high in corporations will not sit as representatives of these corporations in the seats of the mighty, whether in the Senate or the House. In other words, they see that a political crisis is coming, in fact is already here, which will determine for all time to come whether the United States shall be governed by a plutocracy or by the people. They prefer the control of these great undeveloped resources by the state, for the simple reason that it is easier to control the state in which the resources are located than the United States. Whenever in all this broad land you find great resources, whether private or public, there will be found tendencies to plutocracy, for 'where the carcass is, there are the vultures gathered together.'"

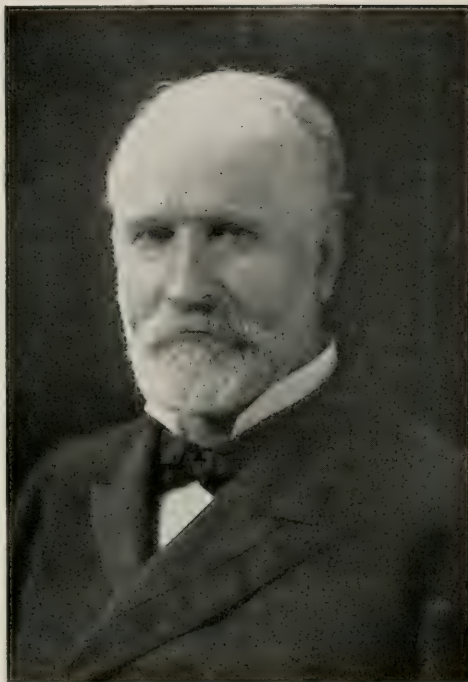
He discussed at some length the problem of country life and its importance to the nation, closing with this declaration:

"It will not do for either city or country to sit idly by while great combinations of capital stretch out greedy and predatory hands to grasp from future generations our great national resources in the shape of coal, phosphates, water power and timber. Nor will it do for the great railroad corporations to build up cities by preferred rates to either places or persons while treating the farm lands as a back pasture from which everything is to be taken and nothing to be returned, nor for a few great combinations to compel Congress to enhance by legislation the cost of the necessities of life."

Mr. Wallace's address abounded in shrewd points and keen criticisms of the preceding speaker, and in sound sense in its discussion of existing conditions.

Two very noteworthy addresses of this session dealt with the subject of country life and the farm. One was by Secretary of Agriculture Wilson, who reviewed some of the achievements of the Department of Agriculture, concluding that "if our country is to grow and develop as patriotic people hope, we must conserve the fertility of our soils, and the moisture that is precipitated not only on our farms but that which falls upon the highlands and now flows to the seas in all sections of our country."

Prof. L. H. Bailey, Dean of the School of Agriculture of Cornell University, spoke on conservation and country life. He spoke of them as two great economic and social movements, not new except in name, and as the subjects of organized movements. As a matter of fact he said that a permanent agriculture is yet unknown in the world. "The conservation and country life movements will pass through propagandic, economic and political phases; but they will eventuate into a new alignment of human forces and a redi-



Hon. James Wilson, Secretary of Agriculture

rection of the processes of social development."

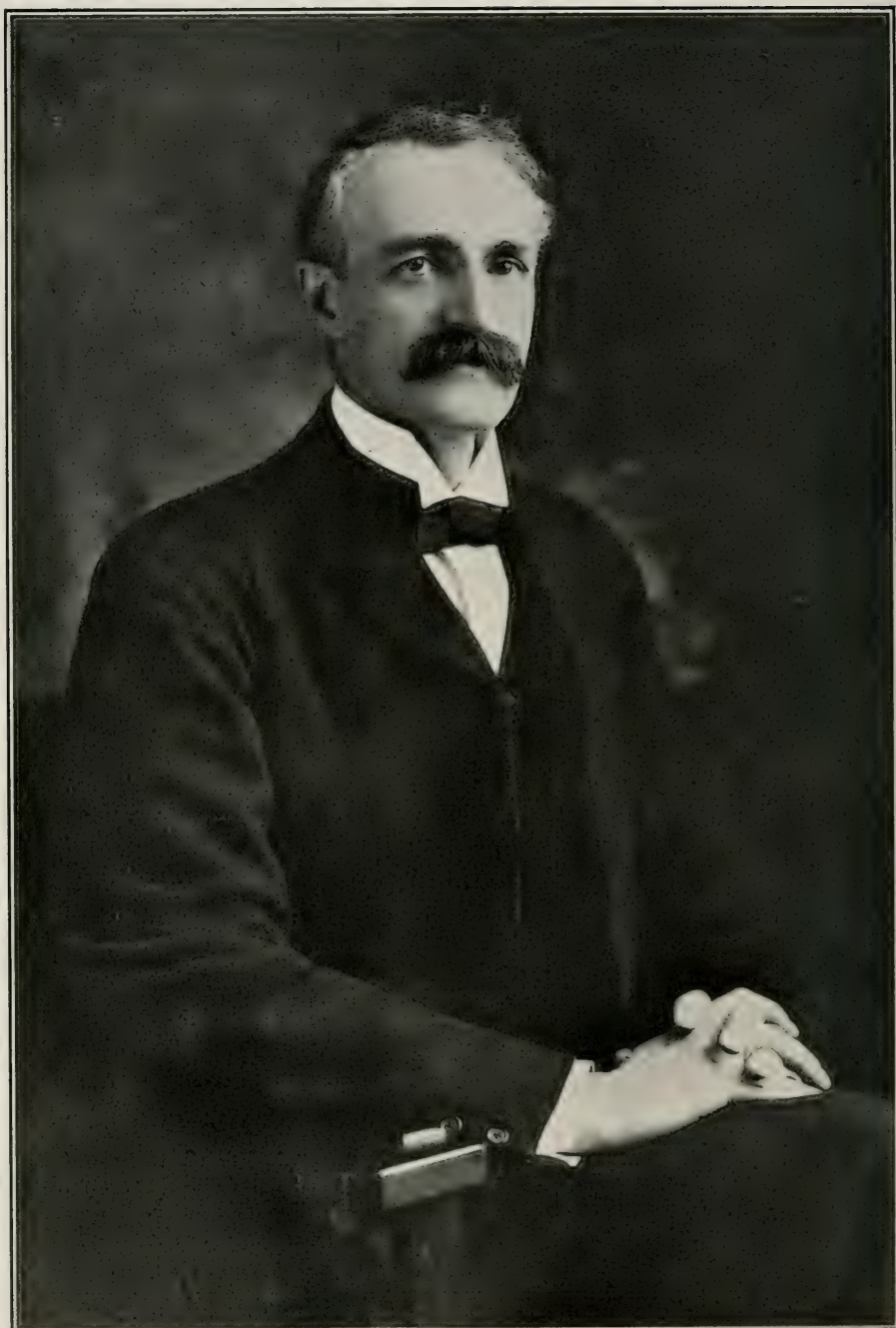
THE CLOSING WORK ON THURSDAY

The failure of some of the speakers to report for duty made it possible to bring the congress to a close with an evening session on Thursday. To those of us to whom forestry is the core of conservation, the great interest of the day centered about the address in the morning by Henry S. Graves, forester of the United States. This address will be found in part in the following pages. That it was pointed and businesslike need not be said. Mr. Graves has been swinging around the circle much since he became head of the National Forest Service and he has made a deep and favorable impression as an efficient public official.

At the close of Mr. Graves' address he was taken with a large party of lumbermen and foresters to the Town and Country Club, where a luncheon was

given by Frederick Weyerhaeuser. The tables were attractively laid and the occasion was thoroughly enjoyed from a social standpoint. There were but two speeches. Gifford Pinchot was present for a few minutes and spoke briefly, acknowledging the co-operation which he had received from the lumbermen and eulogizing his successor in office. Mr. Graves spoke on forestry, its purpose and methods and its relation to the business of the lumbermen, holding the close attention and winning the approval of all those present.

At the morning session of the congress, besides Mr. Graves, John Barrett, director-general of the Bureau of American Republics, spoke on Pan-American conservation, considering it from the point of view of an opportunity and responsibility and making a



GIFFORD PINCHOT

vigorous plea for united action by the countries of America for which he believed the time to be ripe.

Dr. W J McGee, expert in charge of soil erosion investigations, United States Department of Agriculture, spoke on the continent as a home for our people, a subject which his ethnological and soil investigations have especially fitted him to discuss.

Dr. F. F. Westbrook, of Minneapolis, dean of the Medical College of the University of Minnesota, spoke on the subject of life and health as national assets. He earnestly advocated the establishment of a national department of health.

Considerable life was injected into the session by the address of Judge Frank H. Short, of Fresno, California,, on the conservation of capital. Judge Short is an able lawyer and a witty and effective speaker. He frankly confessed being the attorney of a number of large water companies and electric power companies and other corporations, and he made a vigorous defence of capital and threw out a warning to those who are endangering its stability by wild denunciations of wealth. He doubted the ability of the United States government as a controller of monopolies and insisted that the states could do this better, and that the people of the states could not be deprived of their constitutional right of local self-government.

United States Commissioner of Education Elmer E. Brown spoke in the afternoon on education and conservation. He referred to the new movement that has taken place in our education, turning it more toward industry

and industrial life. "This new movement," Mr. Brown said, "is making a new demand for men in the business of teaching, strong men technically trained for their work. We have no national system of education," he maintained, "and do not want it, but we have and are bound to have a national program of education. The federal bureau should survey the whole field of American education and make the best things contagious throughout that field."

Wallace D. Simmons, of St. Louis, discussed conservation from the point of view of the business man. He suggested that expert business men and advertisers should be called in to formulate a scheme of reaching the public generally with the kind of information they want and should have about conservation, and suggested some applications of this idea. Alfred L. Baker, of Chicago, was another speaker who considered the general subject from the point of view of the business man. He declared that the great body of business men favor the well known policies of conservation. They believe in the government control of water power and in the application of scientific forestry to eliminate waste, also in the fire patrol which will prevent the destruction of our forests and of human life.

James S. Whipple, Forest, Fish and Game Commissioner of New York, made a statement in regard to the conservation work in that state which attracted much attention because of its practical value.

GIFFORD PINCHOT STATES THE CONSERVATION PROGRAM

There was, of course, especial interest in the address of Gifford Pinchot on "The Conservation Program." Noting the progress of the conservation movement Mr. Pinchot said that within the last two years it has passed out of the realm of an unimpeachable general principle into that of a practical fighting attempt to get things done. The people believe in it and under such cir-

cumstances the regular method of attack has always been to approve the principle in its general terms and then condemn its methods and men. The soft pedal conservationist asks for safe and sane legislation, which means, the speaker said, conservation so carefully sterilized that it will do the special interests no harm and the people no good. The fundamental principles of

conservation are few and simple. One of the first is that the national resources and the national advantages belong to all the people and should be developed, protected and perpetuated for all the people and not for a few. Another is that the natural resources still owned by the people which are necessities of life, like coal and water power, should remain in public ownership to be disposed of only under leases for limited periods. Every stream should be made useful for every purpose for which it can be made to serve the public. A broad plan is needed without delay for development of our waterways, for navigation, domestic supply, irrigation, drainage and power. Every power site now in state or federal control should be held so and disposed of only under a lease for a limited time with fair compensation to the public. In the development of our waterways the co-operation of the state and the nation is essential for the general welfare. In regard to forests Mr. Pinchot laid down these principles:

"First—All forests necessary for the public welfare should be in the public ownership, such as the national forests already in existence, the proposed Appalachian and White Mountain national forests and the state forests of New York, Pennsylvania, Wisconsin and other states.

"Second—The protection of forests against fires is the first duty of forestry of states and nation alike. The way to stop fires is to get men to them as soon as they begin. The maintenance and extension of forest fire control by the nation, the states, and their subdivisions, and by associations of private citizens who own timberland is absolutely necessary.

"Third—The protection of existing forests by wise use is the first step in forestry. Reforestation is the second.

"Fourth—Land bearing forests should be taxed annually on the land value alone, and the timber crop should be taxed when it is cut, so private forestry may be encouraged.

"Fifth—The private ownership of forest land is a public trust, and the people have both the right and the duty to regulate the use of such lands in the general interest."

Every acre of land should be put to the best use and our land policy should be directed to making of permanent, prosperous homes. Stockmen must be encouraged by every legitimate means. Erosion must be prevented, the arid pub-

lic grazing land should be administered by the government in the interest of the small stockman and the homemaker until they can pass directly into the hands of actual settlers. Rights to the public land should be separated from rights to the forests upon it and the minerals beneath it and each should be held subject to separate disposal. The timber and stone act should be repealed. The speaker applied the same principles to our mineral resources, advocated the maintenance of national and state conservation commissions for perpetuating national efficiency, and urged a national health service to act in co-operation with the states. He urged the need of state co-operation in carrying out the whole conservation program.

The evening session was enlivened by the final efforts of a group from Washington, Montana and Idaho, led by E. W. Ross, land commissioner of Washington, who disturbed the proceedings by loud and insistent demands for a hearing for his state, charged the managers of the congress with having shut off discussion and drew upon himself the fire of other delegates from Washington who were not in sympathy with those appointed by Governor Hay and who protested against what they called the misrepresentation of their state.

The Committee on Resolutions, headed by Dr. Pardee, of California, presented its report and this was adopted. The resolutions are printed in full on another page. This committee is to be congratulated upon the successful outcome of its very difficult task, and it is only fair to say that this outcome was due in considerable measure to its efficient chairman.

The officers elected for the next congress were: President, Henry Wallace, Des Moines, Iowa; Secretary, Thomas R. Shipp, Washington, D. C.; Recording Secretary, James C. Gipe, Washington, D. C.; Treasurer, D. A. Latchaw, Kansas City, Missouri. Vice presidents were named by the different state delegations.

A resolution was offered by Mr. Pinchot on the death of Samuel B.

Green, dean of the School of Forestry of the University of Minnesota, who taught for twenty-two years in the State Agricultural School. It was adopted by the delegates all standing in their places. The resolution follows:

Whereas, Samuel B. Green, dean of the School of Forestry of the University of Minnesota, and for twenty-two years a teacher in the State Agricultural School, has recently been called to his reward;

And whereas, Prof. Green has for years ranked as one of the most prominent and progressive instructors in forestry, and has been a great force in the cause of developing and conserving our natural resources; therefore be it

Resolved, that in the death of Prof. Green the State of Minnesota and the nation has lost a distinguished citizen, and the cause of forestry one of its most valuable assets.

Resolved, that a copy of these resolutions and an expression of our sympathy be forwarded to Mrs. Green.

THE AMERICAN FORESTRY ASSOCIATION

Edwin A. Start, executive secretary of the American Forestry Association, submitted the following statement on behalf of his Association:

No organization can more appropriately than the American Forestry Association make its statement and its appeal to this congress. This Association is the first of our conservation organizations. It has a past of nearly thirty years to which it can point with pride of real achievement; an active and efficient, though not a noisy, present; and a future of ever enlarging opportunity.

In a very real sense we may say that the work of this Association, through long years of much misunderstood effort under the able guidance of the great leaders of the American forestry movement, made this congress possible; for it was through the study of forestry and its relation to the country that the whole problem of our national resources came to be understood. The man who has given the conservation of natural resources its impetus, with the help of his distinguished chief, then President of the United States, was the recognized leader, the apostle and evangelist of the forestry movement; and to-day no portion of our natural resources holds a more important place than the forests. They are inseparably linked with soils and waters, both of which depend upon them in great measure, and as a product of the soil nothing exceeds the forest in value and in necessity to human welfare. Forests, like agricultural crops, belong

to the renewable class of products and their maintenance involves much more complicated and permanent problems than the non-renewable products like minerals, oil, and gas.

Therefore, we conceive the field of our Association to be vital and lasting and so broad, many-sided and far-reaching as to amply justify the existence of an association dedicated to the advancement of scientific forestry for the best utilization of our forest lands for all time.

Our appeal is to the citizen who desires to promote the economic and moral welfare of the nation, for moral welfare comes only through good economics and such management of natural resources as makes for prosperity. It is to the lumberman and to all manufacturers who use forest products, for to them this is a subject that touches the permanence of their industries. It is to the educator who looks beyond mere cultural education and believes that our education must more and more fit men and women to cope with the complex problems of modern life. In this last connection we shall soon announce plans recently set on foot for giving practical and definite assistance to those teachers who wish to bring the fundamental principles of forestry into their work, but who do not know how. We shall try to show them how in a systematic and practical way.

Our work is independent of that of the Government, but conducted in close touch with it. As an independent body

of citizens we can do and say what Government officials cannot do and say.

Our program embodies:

(1) An equitable system of taxation which shall not unduly burden the growing crop.

(2) Adequate protection against fire, which will reduce this greatest of forest perils to a minimum.

(3) The practice of scientific management upon all existing forests.

(4) The planting of all unoccupied lands which can be utilized more profitably for forestry than for any other purpose.

(5) The whole to be brought about through harmonious adjustment of functions between the three classes of owners—national, state, and private. We do not believe that either one of these agencies is to be relied upon alone. Each has its place. I say this because our position in this regard is often misconceived. I may add to correct another misapprehension that we do not believe in putting under forest land that is more valuable for agriculture. Forestry and agriculture are not rivals. They go hand in hand.

One specific object to which we have given much effort for several years is the establishment of national forests on the great interstate water-sheds of the Northern and Southern Appalachians. The conditions which are acute for the thickly populated East can only be handled by the united action of the national and state governments and private owners. The central cores of the White Mountains and the Southern Ap-

palachians clearly require national care and management. With this and co-operation of the states and private owners with the national government, we can save a rare country of beauty, health, and productiveness from being made a depopulated waste. We begin to see the light. In the House of the last two Congresses we have passed a bill, after fighting to a finish the reactionary element which has controlled that body and throttled legislation in the public interest. In the Senate we have a strong working majority which can only be beaten, as in the Sixtieth and Sixty-first Congresses, by filibustering in the last hours of the session. If we are not cheated of our reward next winter we shall make a new step in the progress of American forestry by making the national forest system really national.

We look forward confidently to a future in which the practice of scientific forestry will become general throughout the United States, when our forest lands will be clearly defined and permanently maintained in productive growth, when waste lands will cease to play so large a part in our national statistics, when the production of the forests will cease to be so much less than the consumption of forest products, and the national wealth will be contributed to largely each year from this source. But even with this hopeful outlook we cannot see that our work will ever be done, and we welcome the assistance which this conservation congress can give us.



THE PROTECTION OF FORESTS FROM FIRE

By HENRY S. GRAVES
Forester, U. S. Department of Agriculture

(Part II—Continued from the September number)

THE PREVENTION OF FIRES

IN SOME sections of the country forest fires have always been of such common occurrence that there is a popular notion that they cannot be prevented. The risk from fires can never be entirely eliminated, for in the forest there is always inflammable material which is very easily ignited. They may, however, be largely prevented, and under efficient organization their damage may be kept down to a very small amount. The problem is like that in cities, where fires can never be entirely eliminated, but where the risk of loss to property may be reduced almost to insignificance.

For the successful protection of a forest from fire there are necessary:

(1) The elimination, so far as possible, of the causes of fires.

(2) A proper organization of the forest, including the disposal of slash, the opening of roads, the construction of trails, etc.

(3) An adequate supervision.

(4) Facilities for fighting fires, including an adequate force of men, proper implements, etc.

ELIMINATION OF THE CAUSES OF FIRES

The causes of fires may be grouped under the following heads:

(a) Sparks from locomotives; (b) sparks from sawmills, donkey engines, etc.; (c) camp fires; (d) clearing land and burning brush; (e) burning to improve pasturage; (f) careless smokers; (g) incendiarism; (h) lightning.

Back of any practical plan of fire protection there must be state fire laws and a competent organization to enforce them. In many states to-day there are laws, some of them fully adequate, requiring the use of spark arresters on engines, and punishing incendiarism, carelessness in clearing land and in leaving camp fires, etc. In most states, on the other hand, organizations to carry out the laws and an enlightened public sentiment to support them are lacking. Education of the people to the value of forests and the need for their protection is necessary to overcome the carelessness and ignorance that cause fires to originate from camp fires and clearing land. Vigorous application of the laws will accomplish this result, but the laws will not be vigorously enforced until there is a public opinion back of them.

For the most part, though probably not entirely, the starting of fires by sparks from locomotives may be prevented by the use of spark arresters. If the right of way is properly cleared and patrolled such occasional fires as start may readily be extinguished. Railroad fires are therefore unnecessary. Railroads should be held responsible for damage from fires which they cause.

In the same way, there are excellent devices for arresting the throw of sparks from the stacks of donkey engines and sawmills. When fires start from these sources, it is usually because such devices are not used at all or not properly used.

There will, of course, always be some accidental fires and an occasional in-

PLATE IV



A Favorable Condition for Burning Piled Brush

cendary fire, just as in a city. In certain districts, also, lightning will continue to be an unavoidable cause of fire. The management of the forest must, therefore, be so organized that such fires as do start may be extinguished as quickly as possible.

ORGANIZATION OF THE FOREST

By organization of a forest for protection is meant the establishment of such conditions that the chances of a fire are reduced to a minimum, and that such fires as are started may be extinguished with the minimum of damage. Among measures variously used to accomplish this are:

- (1) The disposal of slash from logging operations.
- (2) The development of roads, trails, and fire lines.
- (3) The establishment of lookout stations and telephone lines.
- (4) The organization of a protective supervisory and fire-fighting force.
- (5) The control of insects which kill trees and cause an accumulation of dead, inflammable timber.

No one measure is sufficient for adequate fire protection. The disposal of dry tops and brush reduces the danger from fire, but there always remains enough inflammable material in a forest to make possible a damaging fire. There must also be roads, trails, or fire lines giving ready access to the forest, so that fires may be located and reached. Nor are these together sufficient, for there must be a constant watching for fires in order that they may be discovered and attacked when they are small and easily controlled and before they have done much injury. All the measures of fire protection are used together, and supplement each other.

Disposal of Slash

The presence of dry tops and piles of brush in the forest constitutes the greatest menace from fires. The severity of a fire, and hence the damage done, is in direct proportion to the amount of dry debris on the ground. Still more

serious is the fact that the presence of this material makes it exceedingly difficult to control and extinguish a fire. If there is no material on the ground other than the ordinary leaf litter, a surface fire may be easily extinguished. Old logs, dead and down trees, and snags lying about on the ground are also a great hindrance to fighting fires, for when once ignited they are apt to smolder for long periods, and so continue to threaten a further spread of the flames. In many of our forests the dead, standing snags constitute a dangerous feature. If these are surrounded by a dense stand of conifers, they often carry the flames up into the canopy and make a crown fire; if isolated, they may burn for days, and finally fall, throwing sparks in all directions. The forester aims to reduce the amount of this inflammable debris in a forest as rapidly as possible, since the "clean" stand is easy to protect in comparison with a stand that is littered with dry debris.

Disposal of Brush and Débris

A first practical step is to prevent a further accumulation of debris in a forest by disposing of the slash from new cuttings. The application in all forests of a uniform method for disposing of this material would, however, be unwise. It should be clearly understood that no fixed rule of procedure and no single method could possibly fit all the different forest conditions in a country so large as the United States. The method used in any given case must be chosen after a careful study, and must rest upon a complete knowledge of the local conditions. Many methods have been tried in the disposal of brush, but those producing the best results are the following:

- (1) Piling and burning as logging proceeds.
- (2) Piling and burning in separate operations.
- (3) Lopping the tops.
- (4) Lopping the tops and scattering the brush.
- (5) Broadcast burning.

PLATE VI



Fig. 1—A Spruce Top Improperly Lopped



Fig. 2—The Same Spruce Top Properly Lopped

*Piling and Burning Brush as Logging
Proceeds*

The most economical method of destroying brush and debris produced in lumbering is to burn it as the logging proceeds. This is possible when the ground is covered with snow or is so damp that fire will not spread. The work is done by the logging crew. As the trees are felled, convenient locations for burning the brush are selected, where no damage will be done to the trees and to young growth left standing, and where the fires will least interfere with skidding the logs. Small fires are started, and as the branches are cut off the trimmers throw them on the nearest fire. One reason why this method is cheaper than the others is because the branches need not be cut up so small, for the fire is already burning when they are thrown on. In coniferous forests the tops burn readily, even on the snow or in stormy weather. Sometimes when it is not practicable to start a fire near a given top, the trimming of the limbs is deferred until the skidders can haul it bodily near a fire. The branches are then lopped and the last cut made, enabling the skidders to go on with the top log, while the choppers throw the brush on the fire.

If the work is systematized, the brush is practically all disposed of as the logs are skidded, and the woods are cleaned up as the logging proceeds. There is a distinct advantage to the skidders through having open ground to work over. This method should be used only when there is no danger of a spread of fire. Its use on a large scale is confined to logging during the season of snow or rain.

The best method of calculating the cost of brush disposal is on the basis of the amount of timber cut, measured in board feet, log measure. A determination of cost per acre would be misleading, because of the great variation of yield in different forests.

The cost varies widely under different conditions. If trees have heavy crowns and large, heavy limbs, the cost is much greater than where the crowns are

smaller. Thus, for example, the cost of destroying the brush produced in logging a stand of large hemlock would be greater per thousand feet of merchantable timber secured than in logging an equal amount in a small-crowned species like red pine. If the trees have a large volume, and the stand is heavy, the cost of disposing of their tops is less than it would be on an equal area for a sparse stand of trees that yielded only a small amount of merchantable timber per tree.

The cost and efficiency of labor must, of course, enter into the cost of piling or burning brush, as it does in any other logging operation. If the men know just how to perform the work to the best advantage, and are industrious and energetic, the cost of piling the brush is much less than otherwise. In many cases the high cost of brush disposal has been simply due to the fact that the men who were doing the work were inefficient, unwilling, or unskilled. Still another factor influencing cost is the ease of the work as influenced by the density and amount of small growth and the irregularities of the ground.

The Forest Service, working in forests in the Lake States composed of mixed red and white pine, has disposed of brush in the manner described at a cost of 12 cents per thousand board feet.

*Piling and Burning Brush in Separate
Operations*

Where the logging is done during the dry season, the brush is piled whenever convenient, but the burning of the piles is deferred until a favorable time, such as during damp weather or after the first snowfall.

The best time for piling brush is during the cutting and skidding of the timber. As the branches are lopped from the stem they are immediately cut up and thrown on a pile. The work is done by the regular trimming crew, and, ordinarily, the extra work requires the addition of only one man to the regular number. The advantages of organiz-

ing the brush-piling work in this way are:

(1) The brush is cleared at once for the skidding of the logs.

(2) The work is done more cheaply than if the brush is piled by a separate crew after the logging is completed; besides, the trimmers have to throw aside the brush in any case to clear the way for skidding. Piling after the logging means a second handling of the brush, and is an expensive operation on account of the inevitable difficulties of picking up the branches from tangled piles.

(3) The men work more efficiently and cheerfully when a part of a trimming crew than when they do nothing but pile brush.

(4) Supervision is more effective and less costly when the brush is piled with the logging than when it is a separate, later operation.

There are circumstances where it is impracticable to pile the brush until after the logs are removed.

Sometimes, when the logging is done in the winter, it is impracticable to burn brush at the time of logging, in the way described in the previous section, or, on account of the deep snow, to pile the brush for later burning. In this event, the piling is done in the spring, as soon as the snow permits.

In locating the piles it is necessary to take into consideration the convenience and cheapness in handling the brush, the clearance of way for skidding the logs, and the safety to standing trees and young growth when the piles are burned. Ordinarily, they are placed at least fifteen feet away from any trees or groups of young trees that may be injured. In forests like spruce, which have a great amount of branches, and where the trees stand so close that the piles cannot be placed at this safe distance, the brush is either piled and not burned, or is thoroughly lopped and left scattered evenly over the ground. When the brush is piled after the logging, the piles are located in the logging roads, skidding trails, and on spots where skidways were located.

The brush piles should be small and compact. (Pl. VI.) As a rule, they should not be over ten feet across or over six feet high. The very small branches are put in the bottom of the pile, with successively larger material laid on afterward. The tops of the branches are placed toward the center of the pile. Trimmed sticks may be leaned against the pile to hold it in shape, keep it from blowing over, and render it more compact for burning. Windrows and large piles make control of burning difficult, and are likely to make such a large fire that the crowns of trees are scorched and injured. Where the stand is clear-cut, however, large piles and even windrows may sometimes be used.

When the piles are loosely thrown together complete burning is very difficult and often impossible. To secure "clean burning" (so called), it is necessary to rebuild open and loose piles. This is called "chunking up" the piles. It is very expensive, for it costs as much as the first piling.

Brush should not be thrown on a top, at least until all branches are trimmed off. Ordinarily, they should be piled away from the top piece of the stem.

In some instances in the national forests the practice has been to stake the piles. Sticks are driven into the ground six or eight feet apart and the limbs are ranked lengthwise between them. (Pl. IV.) The advantage of this method is that it insures thoroughness of work and a compact pile. It has been proved that it costs much less to burn a staked pile than the ordinary irregular pile, and the area of ground burned over is considerably less. This method has been found of especial value when the brush piling has followed the logging. The foreman of the piling crew selects the locations for the piles, drives the stakes, and supervises the work. Organized in this way, the work is done rapidly. Any extra expense of the staking is more than offset by saving in the cost of burning.

The cost of piling brush necessarily varies under different conditions. The first work undertaken in this country

cost as high as \$1 per thousand feet, log run, of timber cut. This high cost was largely due to lack of knowledge of methods and to the inexperience of labor. With better organization and with trained workmen the cost of piling brush in coniferous forests has been reduced

to from 10 to 50 cents per thousand. There is no reason why the piling alone in coniferous forests should cost more than 25 cents per thousand, except where the tops are unusually large and the physical difficulties unusual.

(To be continued)

JOSEPH AUSTIN HOLMES

Chief of the New United States Bureau of Mines

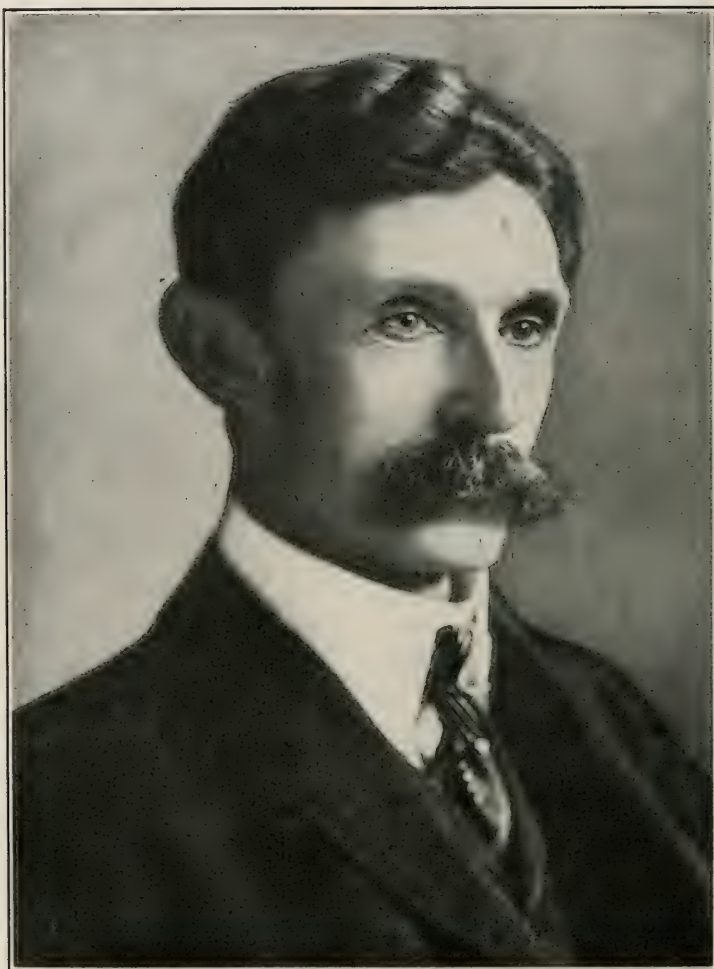
THE appointment of Professor Holmes to be chief of the new Bureau of Mines has come after a contest in which somewhat unusual methods were used to secure the appointment of another candidate. But Professor Holmes had the general support of the mining interests of the country, and his work for the past few years, which resulted in the formation of the bureau, clearly indicated him as the man for the place. His appointment by the President after long deliberation has given general satisfaction.

Professor Holmes was born in Laurens, S. C., November 23, 1859. He took the degree of Bachelor of Science at Cornell University in 1881, and has since received the degrees of Doctor of Science from the University of Pittsburgh and Doctor of Laws from the University of North Carolina. In college and in his later studies he has devoted special attention to chemistry, geology, electricity, general physics, surveying, mining, and metallurgy. He has made close studies of mines and their plants both in the United States and in Europe. He has made a special study of mining with reference to lessening the loss of life and the waste of resources.

He was professor of geology in the University of North Carolina from 1881

to 1891, and has since then been a lecturer on geology in the same institution. He was state geologist of North Carolina from 1891 to 1904. He organized and had charge of the Department of Mines and Metallurgy at the World's Fair in St. Louis, and in 1904 he was a member of the committee having in charge the government fuel investigations. Early in the following year he was appointed by the Director of the Geological Survey to take individual charge of the fuel investigation and of the investigation of mine explosions. These investigations, developed for the last five years, have been transferred to the new Bureau of Mines and at present constitute its main work. As chief for the last few years of the technologic branch of the Geological Survey, Professor Holmes has won the confidence and cooperation of miners and mine owners throughout the country.

Mr. Holmes is a strong supporter of the forestry movement and has taken an active and efficient part in the advocacy of national forests in the Southern Appalachian and White Mountains. He is an admirable type of public official, a man of integrity, broad sympathy, high scientific attainment, and capacity for much and efficient work.



JOSEPH AUSTIN HOLMES
Chief of the New United States Bureau of Mines

RESOLUTIONS OF THE CONSERVATION CONGRESS

The Second National Conservation Congress, made up of delegates from all sections and nearly every state and territory of the United States, met at the call of a great moral issue, now in session assembled in the City of St. Paul and State of Minnesota, does hereby adopt and solemnly declare the following platform of opinion and conclusion concerning the inherent rights of the people of the United States:

Heartily accepting the spirit and intent of the Constitution and adhering to the principles laid down by Washington and Lincoln, we declare our conviction that we live under a government of the people, by the people, for the people; and we repudiate any and all special or local interests or platforms or policies in conflict with the inherent rights and sovereign will of our people.

Recognizing the natural resources of the country as the prime bases of property and opportunity, we hold the rights of the people in these resources to be natural and inherent, and justly inalienable and indefeasible; and we insist that the resources should and shall be developed, used and conserved in ways consistent both with current welfare and with the perpetuity of our people.

Waters of Country Should Be Administered in Interest of All the People

Recognizing the waters of the country as a great national resource, we approve and endorse the opinion that all the waters belong to all the people, and hold that they should be administered in the interest of all the people.

Realizing that all parts of each drainage basin are related and interdependent, we hold that each stream should be regarded and treated as a unit from its source to its mouth; and since the waters are essentially mobile and transitory and are generally interstate, we hold that in all cases of divided or doubtful jurisdiction the waters should be administered by co-operation between state and federal agencies.

Each Use of Waters Should Be with Reference to All Other Uses

Recognizing the interdependence of the various uses of the waters of the country, we hold that the primary uses are for domestic supply and for agriculture through irrigation or otherwise, and that the uses for navigation and for power, in which water is not consumed, are secondary; and we commend the modern view that each use of the waters should be made with reference to all other uses for the public welfare in accordance with the principle of the greatest good to the greatest number for the longest time.

Viewing purity of water supply as essential to the public health and general welfare, we urge upon all municipal, state, and federal authorities and on individuals and corporations, requisite action toward purifying and preventing contamination of the waters.

Commend Reclamation Service

Approving the successful efforts of the United States to provide homes on arid lands through irrigation, we indorse and commend the reclamation service and urge its continuance, and the extension of the same policy to the drainage of swamp and overflowed lands, to be carried forward so far as appropriate through co-operation between state and federal agencies

Viewing adequate and economical transportation facilities as among the means of conservation, and realizing that the growth of the country has exceeded the development of transportation facilities, we approve the prompt adoption of a comprehensive plan for developing navigation throughout the rivers and lakes of the United States, proceeding in the order of their magnitude and commercial importance.

Favor Federal Control of Water Power

Recognizing the vast economic benefit to the people of water power derived largely from interstate and source streams no less than from navigable rivers, we favor federal control of water power development; we deny the right of state or federal governments to continue alienating or conveying water by granting franchises for the use thereof in perpetuity, and we demand that the use of water rights be permitted only for limited periods with just compensation in the interests of the people.

We demand the maintenance of a federal commission empowered to deal with all uses of the waters, and to co-ordinate these uses for the public welfare in co-operation with similar commissions or other agencies maintained by the states.

Approve Withdrawal of Public Lands

Approving the withdrawal of public lands pending classification, and the separation of surface rights from mineral, forest and water rights, including water power sites, we recommend legislation for the classification and leasing for grazing purposes of reserve public lands suitable chiefly for this purpose subject to the rights of homesteaders and settlers or the acquisition thereof under the land laws of the United States; and we hold that arid and non-irrigable public grazing lands should be administered by the government in the interest of small stock men and homeseekers until they have passed into the possession of actual settlers.

Would Lease Mineral Lands for Limited Period

We hold that the deposits of important minerals, underlying public lands, particularly mineral fuels, iron ores and phosphate deposits, should be leased for limited periods not exceeding fifty years, but subject to renewal, the royalty to be adjusted at more frequent intervals, such leases to be in amounts and subject to such regulation as to prevent monopoly and unnecessary waste.

We hold that phosphate deposits underlying the public lands should be safeguarded for the American people by appropriate legislation.

Recommend Leasing of Alaskan Coal Fields

We recommend the early opening of the Alaskan and other coal fields belonging to the people of the United States for commercial purposes on a system of leasing, national ownership to be retained.

We urge immediate investigation by the federal government of the damage done by the smelting of copper ores and the feasibility of so improving smelting methods as to utilize the injurious by-products in connection with phosphatic fertilizers.

We favor co-operative action on the part of states and the federal government looking to the preservation and better utilization of the soils by approved scientific methods.

Approve Federal Control of National Forests

We approve of the continuance of the control of the national forests by the federal government, and approve the policy of restoring to settlement such public lands as are more valuable for agriculture.

We earnestly recommend that the states and federal government acquire for reforestation lands not more valuable for other purposes, and that all existing forests publicly and privately owned be carefully protected by state and federal governments.

Larger Appropriations for Forest Service

We recognize the invaluable services of the Forest Service to the people, and earnestly recommend that it be more generously supported by the federal government, and that state, federal and private fire patrol be more generously provided for the preservation of forests and human life, and appreciate and approve of the continuance of the services of the United States army in fire control in emergencies.

Other Legislation Advised

We favor the repeal of the timber and stone law.

We indorse the proposition for the preservation by the federal government of the Southern Appalachian and White Mountain forests.

We recommend that the federal government conserve migratory birds and wild game animals.

We recommend that the public and private schools instruct the youth of the land in the fundamental doctrines of conservation.

We realize that the fullest enjoyment of our natural resources depends upon the life and development of the people physically, intellectually and morally, and in order to promote this purpose we recommend that the training and protection of the people and whatever pertains to the health and general efficiency be encouraged by methods and legislation suitable to this end. Child labor should be prevented and child life protected and developed.

Safeguards for Conservation of Life

Realizing the waste of life in transportation and mining operations, we recommend legislation increasing the use of proper safeguards for the conservation of life. And we also recommend that in order to make better provisions for procuring the health of the nation a department of public health be established by the national government.

We recommend the adequate maintenance of a national conservation commission to investigate the natural resources of the country and co-operate with the work of the state conservation commissions; and we urge the legal establishment and maintenance of conservation commissions or corresponding agencies on the part of all states of the Union.

Nothing in these resolutions is to be construed as questioning the rights of the states or the people of the United States guaranteed under the federal Constitution.

Acknowledge Hospitality of City and State

Deeply impressed by the sustained interest and unsurpassed enthusiasm displayed throughout this second National Conservation congress, and fully realizing that its success has been due to the warm hospitality of the state and city and the able preliminary arrangements, we are moved to acknowledge our profound obligation to—

His Excellency Adolph O. Eberhart, both as Governor of the state and as one of the active workers throughout the preliminary arrangements, as well as during the congress;

To Hon. Herbert P. Keller, Mayor of the City of St. Paul;

To Paul Doty, Chairman of the Local Board of Managers;

To J. H. Beek, Chairman of the Committee of Arrangements;

To citizens of the state and city, all and several; and especially to the ladies of the Twin Cities, whose hospitality and unremitting interest in the congress have been unbounded.

We feel a special debt to the Publicity Bureau of St. Paul for its action in assuming the responsibility for and meeting out of its own funds the cost of the advance publicity, given in thousands of newspapers, to this congress, and to Mr. Curtis L. Mosher, manager of that bureau; and we heartily appreciate the unusual and most successful efforts of the press to promote the interests of the congress and carry the results of its deliberations to every part of the land.



EDITORIAL

Results of the Conservation Congress

IT IS now possible to gauge with accuracy the impression which the Second National Conservation Congress has made upon the people.

First and foremost, the country was much pleased that the President had prepared for this occasion what must be regarded as in many respects one of his best addresses. None of his speeches has received more widespread editorial approval.

Second, Gifford Pinchot has the well-merited gratification of realizing that the movement which he originated and developed with such brilliant talent, and which he has fought for with such ardor and self-sacrifice, has won. Conservation has taken hold of the nation, or, perhaps more exactly, the nation has taken hold of conservation.

The gist of the proceedings, as well as the platform in which the prevailing opinions of the Congress were crystallized, has been cordially approved. The people understand more clearly than ever before both the objects sought and the measures by which they can best be accomplished. They want the work of conservation carried forward. It is unlikely that the enemies of the movement, no matter by what indirection of attack, will again be able to cloud the issue which has been placed so clearly before the country, or to fool more than some of the people even part of the time.

Furthermore, as was anticipated, the Congress marked the transition to the third stage of the movement, by laying down more definitely the practical lines along which future action should proceed. It is in respect to this that the resolutions are particularly admirable.

No doubt, a larger freedom of discussion would have been advantageous. Many delegates whose views would

have added much to the meatiness of the proceedings found no hearing, and this caused not a little disappointment to those who would gladly have heard them. The overcrowding of the program was in part responsible, and a similar mistake can be avoided at future congresses.



After the Fires Are Out

THE fire situation on the National Forests is again normal. While some fires are burning, the conflagration is past and no fires are now beyond control.

It is still too soon to attempt to state the severe losses in terms of areas and amounts of timber. Enough is known, however, to drive home the lesson of the worst fire season which the Forest Service has yet had to cope with. Mr. Pinchot has stated this lesson in vigorous terms. The need of ready access to all parts of the forests has been demonstrated with overwhelming force. The need of more men to patrol the forests and to fight fires has been made unmistakably clear. Both of these needs were known in advance, and funds to supply them were asked of Congress. Upon those Congressmen who opposed adequate appropriations for permanent improvement work and equipment in the forests, and for enlarging the protective force, falls the responsibility for most if not all of the destruction of the public timber.

Incidentally, the hardships and financial losses of many of the fire-fighters point to the need of an emergency fund for the relief of Government employes injured and thrown out of employment in the protective service. Bitterly hard work, in many cases heroic work, was done by those who fought the fires through those terrific August days and

nights. Such relief as the law provided and voluntary aid could offer was generously given, yet much suffering, as well as the suspension of their salaries, has fallen to the lot of those who bore the brunt of the fight. The members of the Forest Service in Washington subscribed nearly two hundred dollars toward a relief fund, and immediately thereafter the Red Cross placed one thousand dollars to the credit of the District Forester in Missoula for the same purpose. No money was ever more justly earned, but it should rather have been paid by the Nation, in recognition of the loyal service rendered.



A State Superintendent to His Teachers

IN THE last biennial report of the department of public instruction of the state of Florida we find a brief Arbor Day communication by the state superintendent, W. M. Holloway, which is a model in its terse, direct, and simple statement of the benefit and need of tree planting and culture and its moral value to the community. It points the way for educational work through the schools in behalf of the trees, a way that should be followed by educators throughout the country.

We want the teachers in our schools to understand, so that they can communicate the knowledge, what forestry and arboriculture are and what their relation is to the life of our people, especially to the coming generation, now in our schools. To these school children, when they reach manhood and womanhood, the course of certain western statesmen, and of certain capitalists whose motto is "after us the deluge," will be anathema. The United States Department of Agriculture has already enlisted thousands of boys in its campaign for a better agriculture. Austin A. Burnham, general secretary of the Business League of America, proposes a banding of the boys of America, especially the farm boys, in an organization to be known as The Tree Planters of America, to promote the work of reforestation. We must enlist the great body of the school children of America

in the campaign for the perpetuation of the forests and the protection of the trees, so that this may continue to be a good world for them to live in.

Florida has great and rare natural resources. It has undertaken to reclaim one of these, the vast area of the Everglades. Its climate is an exhaustless mine. Its land and water teem with rich gifts to men. Not least in the category are its forests. Nine million acres carry merchantable timber to-day, and twelve million are estimated to be restocking after having been cut over. This comprises considerably over half of the area of the state, and it is probable that much of this land can best be devoted permanently to forest growth.

Here, then, is one of the large items in the state's welfare. Why should not the children who are to make the Florida of the future understand its significance? But Mr. Holloway's communication to his teachers is of nationwide application, and we commend it to the attention of state and local superintendents everywhere. Here it is:

To the Teachers of the Public Schools of Florida:

Tree planting by students in our educational institutions and by the pupils of the public schools is fast becoming a national custom. The kind of trees best adapted to the soils and climatic conditions of Florida, when to plant trees, where to plant them, how to prepare the soil for them, and how to care for them, are all matters of growing interest to the children, trustees, teachers, and citizens generally in every school district of our state.

The wholesale destruction of our great forests during the past thirty years has brought to the attention of the American people, more emphatically than ever before, the facts that the annual increase and growth of our forests must always keep even pace with the demand for lumber and fuel made upon them, otherwise, the time will be short indeed when our forest wealth will become completely exhausted. This is not a new question. Tree planting in European countries has from time immemorial been the custom of their people whenever and wherever the condition has forced itself upon them. Tree planting is now an American custom, sanctioned by law in nearly every state in the Union, and the preservation of our forests from useless and wanton waste will, we predict, be closely guarded in the future.

With the enormous consumption of our forest trees now going on and rapidly increasing, and the consequent diminution of our forest areas, the need of tree planting and tree cultivation becomes greater with every passing year, and the importance of Arbor Day constantly increases.

In view of these facts, let the teachers of the public schools impress upon their pupils the value of tree planting and arboriculture, and instil into the minds of these men and women of the future the knowledge that in the final analysis the best citizen is that man who does most toward the betterment and the brightening of the lives of those about him. Not every one may be able to plant a tree; and yet there will be some civic duty that each may perform which will add its quota to the sum total and give the doer the satisfaction that comes to him who does his duty to himself, to his neighbor, and to his state.



The Appalachian Exposition

THE Appalachian Exposition was opened in Chilhowee Park, Knoxville, September 12. Its declared purposes are to emphasize the vital importance of conserving the forests and streams of the Appalachian region and to exploit the resources and potentialities of this wonderful country.

Eight states of the middle South are represented, and in carrying out the purposes described the exposition aims not only to show the advancement which the South has already made in agriculture, mining, manufacture, and the arts, but also, and especially, to bring out as forcibly as possible by plain object lessons the natural resources of the Appalachian region, their dangers, and the means of preserving them. It calls attention to the commercial opportunities which await development, and at the same time points to the need of guiding the economic and industrial growth of the region along sound and enduring lines.

Located on the highest point within the grounds is the beautiful forestry building, which contains an extensive exhibit, prepared with the co-operation of the United States Forest Service. There is a large relief map of the southern Appalachians, a model with sprinkler showing erosion and the protection of timber cover; exhibits of educational

value to the farmers with reference to terracing; illustrations of destructive and conservative lumbering; specimens of lumber; exhibits of the naval stores and lumber industry throughout the South; maps and transparencies.

It is stimulating to imagine what might have been the course of recent progress in the Northeast and in the Lake States if, at the beginning of modern exploitation, it could have been possible to take stock of their resources and work out systematic plans for utilizing them. For one thing, the forest devastation which has characterized lumbering in those regions, and has given to the South supremacy in the production of forest products, would not then have taken place, and an asset of immeasurable value would have been permanently retained as an investment. Such an exposition as that at Knoxville encourages the hope that the South is awake to the warning furnished by the wasteful misuse of land on the part of her northern neighbors, and that she intends to secure an orderly and sustained development of her resources which will guarantee her future economic wealth and efficiency.

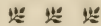


An Important Legal Decision

BY A decision of a United States court, in a case in which the United States claimed damages for timber destroyed by fires originating from sparks along the Missouri River and Northwestern Railroad, an exceedingly valuable precedent has recently been established, in the allowing of \$12 an acre for damage done to ninety-one and two-tenths acres of reproduction. This is the first time that a court in this country has decided that trees of such immature growth as those involved in this case have a value which may be determined and for the destruction of which damages may be estimated and allowed. The basis of the valuation of the reproduction was the figures derived from the actual planting operations carried on by the Forest Service in

the Black Hills, South Dakota, during the past season, in which 1,500 acres were reforested by seeding. It is expected that the results of the decision will be of the utmost importance in connection with the recovery of damages for injury done to young growth by the fires which are so frequently set by sparks from railroads in many parts of the country. Railroads will doubtless come to realize that they will save money by taking proper precautions to prevent such fires in the first place.

In line with this decision is the recent settlement of a case against the Burlington Railroad Company for damages caused by fires in the Galena district of the Black Hills. By this settlement the United States receives the full amount of the estimated damages, part of which was for injury to 300 acres of reproduction valued at \$6.66 per acre.



The Louisiana Constitutional Amendment

NOVEMBER 8 the people of Louisiana will vote on an amendment to Article 229 of the state constitution upon the adoption of which depends the validity of a provision enacted at the last session of the legislature to raise a fund for carrying into effect the general forestry law. The general law provides for a license tax on timber of three-quarters of a cent per thousand feet. The revenue from this tax, which will amount to about \$25,000 a year, will be used to defray the cost of protecting the forests of the state from fire. In 1902 a similar measure was passed, but the courts subsequently held it to be unconstitutional. The proposed amendment was framed for the purpose of overcoming this obstacle. It is as follows:

Those engaged in the business of severing natural resources, as timber or minerals, from the soil of water, whether they thereafter convert them by manufacturing or not, may also be rendered liable for a license tax, but in this case the amount to be collected may either be graduated or fixed, according to the quantity or value of the product at the place where it is severed.

Louisiana has taken the lead of the states in the enactment of conservation laws. The timber revenue tax which may be collected if this amendment is adopted is new in this country and is one of the most progressive measures thus far covered by state legislation. The lumbermen of the state, who will pay the tax, favored the passage of the law under which it will be collected. There appears to be every reason why the amendment should be adopted, and none why it should not.



A Lost Leader

THE conservation movement needs all its leaders. It can ill afford to lose any of those men who by pre-eminent knowledge and ability are best fitted to be its trusted tacticians and generals. For this reason there is cause for keen regret that Prof. Thomas Chrowder Chamberlin has seen fit to surrender his commission in the midst of the campaign, if indeed he has not quite gone the length of engaging himself in the service of the enemy. It may not yet be too late for Professor Chamberlin to reconsider what must, we feel sure, appear to his more deliberate judgment a rash step. He is respectfully invited to reconsider his action.

Professor Chamberlin asserts that "in their fundamental nature, the problems of conservation and the problems of possession are distinct questions, each to be solved in its own way and on its own basis. They center in separate fields. The conservation of natural resources centers in the scientific and the technical; the right of ownership and the most desirable form of ownership center in the political and sociological." Since this is so, runs the argument, "it can only be a careless lapse into confusion of thought, or else a wilful perversion of what is legitimate in the art of persuasion, for an advocate of political or sociological measures to glide without a note of warning from a conservation premise which commands universal assent to a political conclu-

sion respecting ownership or distribution of values which has no logical relation to conservation, and may even be incompatible with its highest realization."

Let it be conceded that the problems of conservation and those of ownership "center in separate fields," and see what this concession amounts to. It amounts to a logical distinction between the ownership of resources and the uses to which they are put. It does not amount to a real separation of ownership from use in actual practice; it throws simply no light whatever upon the problem of the relation of ownership to use. We think that no one will withhold assent to the proposition that ownership of a plot of ground is something quite distinct from the use to which the ground is put; that while one is a legal title to a definite parcel of real property, the other is the application of more or less intelligence and energy to a given set of physical conditions. It should hardly have been necessary for Professor Chamberlin to point out to us so elementary a distinction. But it is a very different thing to assert that, as a matter of human experience, title to the land and the use which is made of the land have no practical relation. The sophistry becomes more evident when we develop the argument, as Professor Chamberlin does, and maintain that because "the best conservation of the soil is not necessarily dependent on the most desirable partition of the land," therefore, by implication, conservation of the soil is in no way dependent in actual practice on the partition of the land. In this whole contention we are dealing with the ancient fallacy which held that a logical concept was identical with the thing conceived, the fallacy by detecting which, according to our recollection, Kant first made himself famous. Ownership and the use of a resource are logically distinct, but in reality they are closely interdependent. Historically this fact is so well known that one of the very first classifications which the student of economic history finds it convenient to make is the classification of the land tenures. Has not Professor

Chamberlin, to paraphrase his own most ingenious sentence, by either "a careless lapse into confusion of thought, or else a wilful perversion of what is legitimate in the art of persuasion," glided without a note of warning from an elementary distinction which commands universal assent to a real separation which has no actual reference to such a distinction, and may even be incompatible with sound reasoning?

Moreover, Professor Chamberlin misconstrues the program of conservation when he tells us, with an air of crushing finality, that "to divide Alaska into 90,000,000 moieties and give each of us one, would not settle the problem of the highest utilization of the Alaskan resources." Who, besides the opponent of straw whom Professor Chamberlin has made that he may destroy him, has ever contended that such a course would lead to such a result? The mere title to a resource will not necessarily conserve it by a process of logical illation, as every one would promptly concede; but we are not at present concerned with the logical implications, but, on the contrary, with the practical results, of ownership. Are we prepared to affirm, for instance, that the prevailing system of individual ownership of land in the United States has had no bearing historically on the development of the resources of the United States? Again, it is surely significant that the reasoning by which Professor Chamberlin attempts to separate ownership from the conservation of resources has been most loudly applauded by representatives of those corporate interests which own most resources, and use them with least regard for the general welfare.

But there is an even more important weakness in the argument which would erect a barrier between the scientific and technical aspects of conservation, on the one hand, and the political and sociological aspects of conservation, on the other. It was Mr. Roosevelt who first pointed out that our natural resources are our national resources as well. Conservation is no mere academic question; it is a national issue, because

it affects the welfare and happiness of the people of the country as a whole. Science and technic, therefore, are properly the servants of conservation, the orderly and systematic means by which the ideals of conservation are to be approached—with methods for reform in the “distribution of values” as one of their important aids, beyond question. But the movement itself is fundamentally a demand for the honest and efficient stewardship of the people’s property in the resources of the nation. Of necessity, it is a political movement, because it has been set in motion in response to an ethical awakening which, in turn, was brought about by a broader and more farseeing vision of economic and sociological requirements. It can no more be kept out of politics than could slavery; it touches human rights and liberties.

Before leaving Professor Chamberlin’s criticisms, we feel constrained to note one further difference of opinion. In effect, he asserts that as a matter of history, geologists, more than any others, have been the fathers of the real conservation movement. We do not believe that this statement is supported by the evidence, particularly if it is meant by it to include the history of other countries. It has been our impression that, as a rule, the forests were the first resource to which conservative methods were applied in other lands. As regards the United States, we believe it entirely just to say that the development of the national forest policy led the conservation movement in the beginning, and leads it still. Incidentally, it is worth while remembering, too, that forest conservation on a national scale was made possible only by invoking the rights and duties of national ownership, a fact which we particularly invite Professor Chamberlin to reflect upon.

Henry Wallace

To the farmers of the middle West Henry Wallace, president of the Third Conservation Congress, is well known. He was born seventy-four years ago on a farm in Westmoreland County, Pennsylvania. He was educated for the ministry of the United Presbyterian Church, and for ten years, from 1866 to 1876, preached in Illinois and Iowa. He was threatened with tuberculosis, which was prevalent in his family, and was advised by his physician to take up an outdoor life. He purchased a number of farms in Western Iowa and entered upon an active and successful career as a farmer. He began to write on farm topics and became an influence for the betterment of country conditions in the middle West. In 1885 he established in Des Moines, with his sons H. C. and J. P. Wallace, *Wallace’s Farmer*, the motto of which is “Good farming, clear thinking, right living.” It was through his influence that the special trains for agricultural education were introduced in the West. He was appointed by President Roosevelt a member of the Country Life Commission.

Mr. Wallace has never ceased to be a preacher as well as a farmer. His writing has been devoted as much to elevating the standard of life and character in the country as to improving the technical and business conditions of the farm. He is very active in church work and gives a noon hour’s talk each Thursday during the fall, winter, and spring months at the Des Moines Y. M. C. A., which is attended by scores of business men of the Iowa capital.

The choice of Mr. Wallace for president of the congress seems to be a wise recognition of the largest element in the conservation problem—the tillers of the soil.



THE FOREST AND THE NATION

By HENRY S. GRAVES

An Address Delivered Before the Second National Conservation Congress
St. Paul, Minn., September 8

THE movement for the conservation of our natural resources has reached the second and most critical stage in its progress. The country has expressed in unmistakable terms its approval of the principles of conservation; there is now before the country the problem of the practical application of those principles. In forestry there is a very general agreement that our forests must be protected from fire, that waste must be reduced, and that a future timber supply must in some way be provided. In applying these principles differences of opinion arise, and it soon develops that with many persons the interest in forestry is confined to the abstract idea and does not extend to its practice.

When the requirements of forestry are considered, forest owners usually find that they must make some modification in their methods of cutting; that they must use more care in protection from fire and in saving young growth, and that if they are to secure a new growth of trees after cutting, some investment is necessary. The general public learns that in order to secure for the nation the permanent benefits of the forest, national and state expenditures are required.

It is at this point that indifference and even opposition to conservation arise. Indifference is shown by the public when it fails to make adequate appropriations. Direct opposition appears from those who fear that their interests in one way or another may be adversely affected by it. There is a great deal of misunderstanding in regard to the methods of conservation and many have charged that those methods heretofore advocated are impractical. In order to be successfully applied conservation must be practical, but at the same time the methods must be such as will actually accomplish its real purposes. To my mind the significance and value of this congress is that an opportunity is afforded to make clear the methods of conservation, and the country will then decide whether it shall really be put into practice or become a mere name.

It is not my intention in this address to dwell at length on the fundamental import-

ance to the country of forest conservation. To those who know the needs of the people for forest products, the available resources and the manner in which they are now being used up and destroyed, it must be clear that we are facing a problem which must be met with prompt and vigorous action.

A survey of the forest resources of the world shows clearly that in the long run this nation must be dependent chiefly upon its own supplies. Those who believe that we may destroy our own forests and then draw upon foreign resources of timber are ignorant of the facts, for those supplies will not long be available. Foreign countries will need for their own use what they can produce, and many of the exporting countries are exhausting their forests just as rapidly as America. The timber supply in this country is being rapidly depleted. We are extravagant in our use of forest products; there is waste in logging and manufacture, and the loss by fire is a shame to the country. To offset this reduction of merchantable resources the annual production of timber by growth amounts to much less than one-third the average quantity used and destroyed. In other words, we are actually using up our forest supplies.

There is a sufficient amount of land in the country better suited for forest growth than for other purposes to produce all the wood and timber needed by the nation, provided the forest is properly handled. This land includes mountain areas where the protection of the vegetation is necessary to conserve water and protect the slopes. The protective benefits of the forest can thus in most cases be secured at the same time as the production of wood and timber. There are, however, certain mountain regions of the West where large trees will not grow and where the cover of brush and grass must be conserved to protect the slopes and to regulate the run-off of water. In these mountains special reservations must be maintained, primarily for protective purposes.

There is but little disagreement in regard to these simple propositions. The difficulty lies in the fact that the people do not appreciate the need of immediate action to

put the principles of forestry into practice. The reason why the need of prompt action is not appreciated is that, except locally, the effects of forest destruction have not yet been keenly felt. It is true that the prices of certain grades of lumber have tended to increase. This increase is in part due to the reduction of supplies, but is also due to the same causes of increased cost of production as have raised the price of other manufactured commodities. The development of railroad transportation and of methods of logging have constantly opened new forest resources and furnished a supply to the public. There are to-day over 30,000 saw mills throughout the country cutting timber and competing for the market. Although the prices of lumber may seem high to the consumer, it is still true that in some sections the competition among manufacturers is keeping the prices down to a point where it is hard to market low grades and to utilize in full any but the best trees in the forest. As long as the value of timber is below what it will cost to produce it by growth, the general public will not realize that our supplies are being depleted. It is after the virgin supplies are exhausted—and that will come in a comparatively short time—that the great increase in values will come and the public will suffer. We are urging action now in order that there may be new supplies produced to meet the needs of the nation at that time.

The general public fails to appreciate the effect of forest destruction on stream flow and on soil erosion. Some even go so far as to deny the connection between forests and stream flow. There are many factors which determine the stability of water flow. Climate, character of soil, topography and vegetable cover, have an influence on the run-off of water. There may be a change of conditions of one or more of these influencing factors sufficient to upset the equilibrium established by nature and to alter the manner of run-off of the water in a given watershed. In humid regions, when the forest is cut off or burned, a cover of young trees or bush often springs up quickly and protects the slopes before the character of the stream channels is changed. A single clearing of the forest may thus have only a small or temporary effect on water flow. The repeated destruction of the cover may, however, result in a permanent change and finally produce torrent conditions. Thus in the southern Appalachians it is not so much the present and past conditions—although those are serious—which demand forest conservation, as what will inevitably be the result of continued destruction of the cover.

Where the conditions for forest growth are critical and the soil and topography such that the balance of nature is easily disturbed, the effects of forest destruction are much more quickly felt. In certain parts of the West we find already examples of

flood and torrent conditions equal to those in France and Asia. For example, in Utah there are watersheds where on account of the burning of the forests and the over grazing of slopes torrent conditions are already definitely established. One of the most extreme and striking instances in the West is found on the watershed of Kanab creek, flowing through southern Utah and northern Arizona. As the result of overgrazing, the tributary streams have already become deep washes, many new and deep gulches have been formed running into the main channel and into the side channels. The water which falls on the surface is quickly carried to some stream or wash, which becomes a miniature torrent. The gathering of these together in the main channel makes a flood which is irresistible. The loss from the destruction of dams and bridges, the washing away of arable lands and deposits of rocks and gravel on cultivated fields has been enormous. The restoration of vegetation alone will not cure the evil. It is now an engineering problem to check the torrent flow of water in the various streams and washes.

In spite of the increasing evidence of the effects of forest destruction the public still fails to appreciate the need of prompt action to prevent the scarcity of timber and to protect the flow of our streams. The time for action is before a disaster and not afterward. The small public investments necessary for forest protection are insignificant when contrasted with the losses and hardships to communities from forest destruction.

The forest problem is peculiarly difficult on account of the length of time required to produce timber of useful dimensions. We to-day are using trees which, for the most part, are over 150 to 200 years of age. The time required to produce trees suitable for lumber varies from about forty years with our most rapid growing species to about 100 years in many mountain regions. The production of timber requires a long investment. It requires the permanent use of land for forest growth and a stable policy in handling the forest. At the present time in this country there is a great risk of fire, which discourages the investment of private capital in the growing of timber. By its very nature, therefore, the problem of forestry presents great difficulties to the average private owner of forest land, who has bought the property to market the merchantable timber and not to grow trees. Forestry always involves some investment. Private owners will not, as a rule, make this investment, unless there is a return clearly in sight. On account of the long investment, risk of fire, a burdensome system of taxation of growing timber, and the present uncertainties of market, most lumbermen to-day are not practicing a system of forestry which takes into consideration the

production of new timber supplies. Many say that if fires are kept out the question of forest production will take care of itself, no matter how the forest is handled, and that all there is to forestry is protection from fire. Let me say, and with all the emphasis I am capable of using, that forest production will not take care of itself. There are cases, and remarkable ones, of natural reproduction of forests even under the worst of abuse. But where there is no systematic provision for reproduction ordinary lumbering results in the long run in a steady reduction of growth of valuable material; and there are only too many cases of destructive lumbering which leave the land in an unproductive state even when fires do not occur.

Forestry is necessary to guarantee to the people the continuous benefits of the forest. The responsibility of working out the problem of national forestry can not be left with private owners. It is primarily a public question and the burden of its solution must be largely borne by the public. In the first place, those forests owned by the public must be protected and administered under the methods of practical forestry. These public forests comprise about one-third the forest area of the country. The remaining two-thirds of our forests are in private ownership and this includes about four-fifths of the standing merchantable timber. Without doubt the area of the public forests will be increased through the acquirement of areas needed for the protection of public interests, especially in the mountain regions of the East. But the federal and state forests alone will not be sufficient to produce the supplies of forest products needed by the nation. The practice of forestry on private lands, or at least on those areas better suited for forest growth than other purposes, is a public necessity. The private owner can not escape the responsibility of ownership of an important natural resource; at the same time he can not be expected to make financial investments in order to provide for a general public benefit. The conditions which prevent him from practicing forestry must be changed. He must be given public aid in protection from fire. There must be a reasonable system of taxing growing timber, and there must be co-operation in meeting the peculiar difficulties of his business which tend to stand in the way of conservation.

The practice of forestry by private owners must be brought about through assistance and co-operation by the federal government and the states. The government can do a great deal to promote private forestry. It is the policy of the Forest Service to aid in the introduction and practice of forestry on private lands, just as far as its authority permits. This assistance must, however, be largely confined to education, advice and general co-operation. Through research

and experiment the government is laying the foundation for the practice of forestry in all parts of the country. The results of the work in forest products will greatly help in the problem of saving waste. The experiments in silviculture are demonstrating the methods of handling woodlands. Direct aid to private owners in the practice of forestry must come chiefly from the states. The proper adjustment of taxes is a state matter. Assistance in fire patrol and fire fighting must come from the states. If, on the other hand, this aid is given by the states and the government and the obstacles now standing in the way of private forestry are removed, private owners must assume their obligations in actually setting to work to practice forestry.

The first necessity is prompt and effective action by the states. As yet the states have not assumed their responsibility in forestry. In a number of them good forest laws have been enacted, several states are buying land as public reservations, and in about fifteen states a forest commission or state forester has been appointed. But the problem of state forestry requires a great deal more than laws on the statute books, or the appointment of a state forester. There must be the machinery to carry out the laws, a thoroughly equipped organization to patrol the state and fight fires, and adequate appropriation of money to make this work really productive of results. The real test of state forestry will be the development of a forest policy which will be stable and the providing of the money necessary to carry on the work.

The first duty of the federal government is the proper administration of the forest lands owned by the nation. A national forest policy already has been initiated. The greater portion of the federal forest lands have been set aside as national forests and they have been managed on the principles of practical conservation. The purpose of establishing these forests has been to guarantee the best possible use of their resources to the people. There is still an impression among some persons that the national forests are closed reservations and withdrawn from use and development. The keynote of the federal policy in handling these forests is the use of their resources; but it is the continued use in contrast to that use which exhausts the resources. There are many who assert that the national forests are retarding development. It is the policy of the Forest Service to encourage the opening up and development of the resources of the forests, but we take the stand that this must be a development which will permanently build up the country. Our policy stands for permanent development and maintenance of stable industries, as opposed to mere exploitation which exhausts the resources and which shortly results in the impoverishment of the region.

In administering the national forests the first task is to protect them from destruction by fire. In order adequately to protect forests from destruction by fire, the first necessity is a system of roads and trails to enable proper patrol and movement of fire fighters, and telephone lines for quick communication. The second necessity is a well organized force of rangers and guards to patrol the forests and fight fires. Ever since the national forests were placed under the administration of the Forest Service the construction of trails and telephone lines has been pushed as rapidly as funds could be secured for that purpose. Although there have already been built 9,218 miles of trails, 1,218 miles of roads and 4,851 miles of telephone lines, this represents but a beginning of the work when the vast area of inaccessible and undeveloped forests is considered. The Forest Service has a well organized protective service for patrol and fire fighting, though the number of men is still inadequate. Nevertheless it has been possible in ordinary seasons to keep down the fires to a small loss. During the present season there have been in the Northwest an unparalleled drouth and constant high winds that have made fire protection unusually difficult. Innumerable fires were started from various causes in the forests. The woods were dry and a small spark was sufficient to start a blaze. Where there were roads and trails the patrolmen were able to reach the fires quickly and either put them out in their incipency, or soon mobilized a force of men who brought them under control before they had done much damage. This was well demonstrated by the fact that in the Montana and Idaho districts the majority of railroad fires were put out by the patrolmen before they reached dangerous proportions. Many fires were started also in the inaccessible portions of the forest where there are no roads and trails. It was often impossible to reach those fires until they had been burning for several days and in many cases had become dangerous conflagrations. The disastrous fires were those occurring under these conditions.

The great lesson of these fires is the absolute necessity of complete system of roads and trails and telephone lines. I meet some men who say that forests can not be protected from fire and that sooner or later every extensive forest will be burned. The experience in the northwest this year only strengthens my conviction that forests can be protected from fire even under the most adverse climatic conditions. But this protection absolutely requires a proper development of the forest in the way of transportation and communication, and an adequate force of men for patrol. The national for-

ests can be rendered safe from fire, but they must be organized for it. This requires extensive construction work at the outset. It requires a large investment in permanent improvement work by the government. But that necessary expense is insignificant in comparison with the value of property which will be protected and the benefits to the communities and industries depending on these forests.

The national forests are for use and are administered primarily for the benefit of those states and communities in which they are located. The various resources are opened to use under reasonable restrictions which will guarantee their best continuous service to the greatest possible number of people. The mature timber is cut when there is a demand for its use, but the cutting is conducted under the principles of forestry, so that new growth is established in openings made by lumbering and the continued supply of timber is provided for.

The government should encourage the utilization of the mature timber and sell such as can be absorbed by a legitimate demand. The timber should not be sold for less than its real value. If the demand is not sufficient to bring its real value, the timber should be held as a reserve till it is really required, as it soon will be. The national forests should not be managed with reference solely to public revenue. The policy of timber sales and other business on the forest must be based primarily on principles of broad public economy.

The other resources of the national forests are also being put to use. The grass is utilized under a system of regulated grazing, land more valuable for agriculture than for forest purposes is opened to entry under the forest homestead act, prospecting is allowed without restriction and legitimate mining encouraged. It is the aim of the Forest Service to encourage the development of water powers, and we are endeavoring to work out a practical plan which will facilitate this development by private capital, and at the same time protect the interests of the public. I believe that the use of water power sites on federal lands should be under government control, and I believe that this can be accomplished so as not to prevent the attraction of capital to their development.

So far as the national forests are concerned, conservation has already been carried into the practical stage, for it is being put into actual operation. The national forests will always stand as a monument to the work of the real founder of the conservation movement, Gifford Pinchot.

NATIONAL FOREST WORK

Progress in Planting

While practically nothing is to be done this fall toward reforesting the areas burned over by the recent fires in District 1, old burns in this district will be reforested as rapidly as possible. The work will be handicapped by a shortage of seed of the species which it is desired to plant, namely, Coast Douglas fir, Idaho white pine, and Western yellow pine suitable for the conditions on the western part of the district. Western yellow pine from the Black Hills to the amount of 10,000 pounds will be procured for seed-spot and broadcast sowing in the eastern part of the district, at a cost of \$10,000.



Fence Posts for a Single State

The Forest Service estimates that the farmers of the single State of Iowa use every year \$1,400,000 worth of new fence posts, which cost the equivalent of \$600,000 for setting them in the ground.



Changes of Boundary

By presidential proclamations, the following changes have recently been made in the areas of national forests, in accordance with the plan inaugurated more than a year ago and finally agreed upon by the Secretaries of Agriculture and the Interior, looking to the correction of the forest boundaries.

Approximately 18,330 acres were added to the Kaibab National Forest, Arizona, and at the same time 10,880 acres were eliminated. The area added contains some timber, but the addition was made mainly to secure a better administrative boundary. The petition requesting that this land be added was signed by practically all the local settlers concerned.

The Zuñi National Forest, Arizona and New Mexico, was changed in boundary by the addition of 126,001 acres and the elimina-

tion of 5,219 acres; and the Mt. Taylor Division of the Manzano National Forest, consisting of 215,601 acres, was transferred to the Zuñi.

The additions comprise commercial forest areas and woodland areas adjacent to the several divisions of the forest, and include a total stand of approximately 780,000 cords of juniper, pine, and hardwood, in addition to some 90,000,000 board feet of commercial yellow pine timber.

From the Hayden National Forest, Wyoming, elimination was made of 6,075 acres, located along the northern and eastern portions and embracing a number of small tracts which contain no timber and are chiefly valuable for grazing.

The areas and boundaries of the Nebo and Wasatch National Forests of Utah were considerably modified. The Nebo, which comprises several separate tracts, loses by elimination approximately 15,122 acres, and by transfer to the Wasatch the tract known as the Vernon Division. The lands eliminated are either in the main already alienated or are adapted to grazing and dry farming.

The Wasatch Forest loses by elimination approximately 1,440 acres; it gains approximately 8,713 acres formerly not a part of any forest and approximately 54,240 acres by transfer from the Nebo Forest.

More than half a million acres have been eliminated from five national forests in Colorado. The forests affected and the areas eliminated from each are as follows: Leadville, 42,340 acres; Pike, 51,024; Montezuma, 348,681; San Juan, 18,810; and Rio Grande, 64,849. The area of the Montezuma National Forest has been further decreased by the transfer of 18,550 acres, comprising the La Plata watershed, from it to the San Juan. This leaves the aggregate area of the San Juan about the same as it was before the eliminations were made, and reduces the Montezuma by 367,231 acres altogether.

STATE WORK

Forestry Progress in Vermont

The following is an authorized statement regarding the progress of forestry in Vermont recently given out by Austin F. Hawes, state forester:

While the office of state forester was not created until legislative action was had upon the subject in 1908, forestry properly began in Vermont two years before, when the legislature of 1906 provided the small appropriation of \$500 for the establishment of a state nursery for forest trees upon the state farm at Burlington. Naturally in the beginning of the movement for scientific forestry the work is mostly of an educational nature. It is not the policy of the state to force forestry upon land owners, but to show them that timber is a profitable crop to grow on the poorer classes of land, and that it is for the interests of owners of such lands to handle them with a view to permanent profits rather than temporary profits, as has characterized the cutting of timber in the past.

I assumed the office of state forester, April 1, 1909, and since that date I have given 63 addresses in various towns of the state before farmers' meetings, grange meetings, men's clubs, Y. M. C. A's. and other organizations. In all these meetings I have found a very gratifying interest in the subject of forestry and have found a great many people in an inquiring mood concerning the best methods of handling their forest properties. During this same period exhibits from my office have been furnished the various agricultural fairs, and the 'Greater Vermont' exhibit, which was held in Burlington at the time of the Champlain tercentenary. These forestry exhibits have consisted of boxes containing different kinds of forest seedlings which are advocated by the forestry office for planting in this state; also many pictures illustrating good and bad management of forests, charts, maps and kindred information. These exhibits proved a very popular feature at the fairs of last year, in their attracting of a large number of visitors. My office also had a forestry exhibit on the Better Farming special train which the commissioner of agriculture ran, through arrangement with the Rutland railroad, last spring.

From small beginnings authorized by the legislature of 1906, the state nursery for forest trees at Burlington has been extensively enlarged by means of liberal appropriations by the legislature of 1908, so

that this nursery is now one of the largest in the country. It contains over 3,000,000 trees at the present time, and from it this year there have been sold 675,000 trees to about 100 parties scattered all over the state. Windsor county has been the largest consumer of seedling forest trees, there having been placed in that county 334,000 seedlings. Windham county comes next with 104,050; Washington third with 85,000; Franklin fourth with 53,100; Caledonia, 51,300; Orange, 49,950.

Many examinations have been made by this office of private timber holdings, and in numerous instances detailed working plans have been made for owners that have involved future management for a series of years. On some tracts I have marked the trees which should be cut. This work has been done for private owners by their bearing all traveling expenses to and from Burlington. This satisfies me that interest, aside from forest planting, has been developed in the state, and that owners of timber lands are beginning to make use of the forestry office in practical ways, which involve the thinning out of young timber and the more judicious harvesting of mature timber.

Two state forests have been established. One of these was purchased by the state. This one is at Plainfield and consists of 460 acres, for which the state paid on an average of \$4 per acre. The other, situated in Sharon, is the gift of Mr. Charles Downer of that town and it consists of 350 acres. On each of these forest tracts 35,000 trees have been planted during the past year. At the Sharon forestry reservation a nursery, subsidiary to the one at Burlington, has been established. It is intended that these tracts shall furnish examples to the people of best forestry methods. It is advisable that similar tracts be established in the various counties of the state, in order that these examples of correct forestry methods may be as easily accessible to the people as possible.

There have been issued from the forestry office various bulletins, the most important of which has dealt with the question of forest fires. This bulletin was issued after a careful investigation of the serious forest fires in the fall of 1908, when about \$7,000 was expended from the State treasury in the work of fighting fires. As a rule, at such times, the fire wardens in the state have done efficient work, but I think that the present system could be supplemented in such a way that in season of severe

drought and consequent danger from forest fires, the state forester should have authority to appoint supplementary wardens in exposed districts. I also favor the establishment of fire observatories on the tops of our highest mountains, after the plan adopted in Maine, New Hampshire and New York.

I am satisfied that a wholesome and encouraging interest in the prosecution of the work of the forestry office characterizes the attitude of the people of Vermont. I have found gratifying encouragement upon every hand and the demands upon the office, due to an increasing public interest in it, are steadily growing.



Progress in Hawaii

A communication from Ralph S. Hosmer, superintendent of forestry in Hawaii, summarizes the advances made in forestry in the islands during the fiscal year just ended.

Early in 1909 the legislature passed an act authorizing the levying of a tax of two per cent on all incomes over \$4,000 (in addition to an existing income tax of two per cent with a \$1,500 exemption), three-fourths of the fund so created to be used for assisting immigration and one-fourth for conservation, which was read to cover the appropriation for the territorial board of agriculture and forestry, assistance to the Hawaii experiment station, and to the College of Hawaii, and the work in topographic mapping and hydrographic measurements now being carried on in cooperation with the Geological Survey. Heretofore, the sum annually allotted to forest work has amounted to about \$12,000 a year. It is expected that for the present fiscal year this amount can be materially increased. Though the act dealt primarily with immigration, its passage was of interest as showing the trend of public opinion in Hawaii, since it was backed by the larger corporations, on which the principal burden falls. A lively campaign of education in behalf of forestry and general conservation was carried on in the schools, including the Normal School.

During the year the number of forest reserves was increased from twenty to twenty-two by the addition of tracts comprising 872 acres, and the total acreage of the reserves is now 546,636 acres, of which 358,052, or sixty-six per cent, is government land.

The people of Hawaii are helped in tree planting in three ways: By the giving of advice as to what, where, and when to plant; by furnishing seedling trees for planting, free or at cost; and by making experimental plantations of trees of economic value, new to the territory. During the past year special attention was given to the free distribution of trees, both from the government nursery at Honolulu and from distributing points on the other islands. Two regular substations, with paid assistants, have been

established at Kalaheo, Kauai, and Hilo, Hawaii, where trees are grown and kept constantly on hand to be given out. By cooperation with sugar plantations and ranch companies at six other places throughout the territory, trees were started and distributed at the time of Arbor Day. In 1909 there were distributed free for Arbor Day planting to homesteaders and other land owners, and to schools and institutions, over 62,500 trees, probably the largest number ever given out at one time in the territory. During the last fiscal year almost 185,000 trees were distributed. A large number of these were supplied for planting on lands controlled by the army and navy.

A great deal of private planting is done. A year ago the total number planted in the territory reached 500,000, and the estimates for the past year are even larger than this.



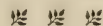
Washington Plans to Buy Tax Lands for Reforestation

The Washington committee on forest legislation has decided to ask the state legislature to enact a law which will enable the state to buy outright, at a price not to exceed three dollars an acre, lands that have reverted to the counties for the failure of former owners to pay taxes. This plan will be more fully noticed in a future number of AMERICAN FORESTRY.



Forest Planting in Massachusetts

During the past season 1,000,000 trees were planted in Massachusetts, under the direction of the State Forester, Frank W. Rane. The area covered was about 1,000 acres. Last year about the same work was done, so that the area thus far planted in the state amounts to 2,000 acres. The cost has been \$20,000 for the two years.



Kansas Forest Planting

The weekly bulletin of the Kansas State Agricultural College says that State Forester C. A. Scott has been much in demand this summer by persons desiring information or plans for forest and park planting. The following plans have lately been perfected:

A general plan for a city park at Conway Springs, and a planting plan for the State Reformatory farm at Hutchinson, Kansas. This plan includes the planting of windbreaks to protect the cultivated fields from the encroachment of drifting sands along the Arkansas river, the planting of some thirty acres of sand-dune lands in forest

trees to grow commercial timber, the straightening of Cow Creek, and the planting of waste lands along the same stream. A small forest nursery has been developed on the farm to grow the necessary trees for these plantings and also to give the inmates of the institution an opportunity to acquire training in nursery work. As a landscape feature, the plan provides for a park and a lake of considerable size, the lake to be fed by Cow Creek. Planting plans have also been prepared for the Larned fair grounds, the Dodge City school grounds, and the Butler county court-house yard. Among uncompleted work are the general plans for city parks at Newton, Columbus, and Harper. Applications are on file from several private persons for working plans for the management of farm woodlots.



British Columbia's Practical Forest Policy

Premier McBride of British Columbia, in a recent address before the Victoria Board of Trade, at their annual meeting, spoke of the resources and development of the country. The most interesting portion of the address, from a lumberman's point of view, was the reference to the work of the timber commission. Premier McBride's announcement that the commission's report is expected in a few months, and that the legislature will pass effective legislation based upon the report, gives promise of the settlement of many of the difficulties which have long been a source of worry and expense to the lumbermen. The granting of renewable licenses at the suggestion of the commission in its interim report, indicates that both the government and the commission have realized that the interests of the people and the interests of the lumbermen are the same. If the governments of other provinces could be induced to take a similar view of the matter, the lumbermen would be more likely to take a keen interest in their properties. Another reference of Premier McBride's showed that both the government and the commission were working carefully upon a plan for reducing the loss of timber by fire. It is probably safe to conclude that, in addition to increasing the fire-fighting staff, this plan will involve extremely strict regulations regarding the railroads, which have been proved to be one of the greatest causes of fire.

Premier McBride's references to lumber matters were in part as follows:

"The timber industry of the province is a subject which it is difficult to deal with in a few words. The output of lumber for 1909 was 775,000,000 feet, valued at \$12,000,000.

Of this, 450,000,000 were cut from coast mills and 325,000,000 feet from mountain mills. The total cut is an increase of 10,000,000 feet over 1908. The outlook for the present year is particularly bright.

"In connection with the timber industry, the government is taking special pains to secure the best means of conserving this resource by means of a commission, which will report on the best methods to pursue, so that the wisest legislation may be enacted. We are fully determined to protect this unrivaled asset. The commission has visited every portion of the province and collected data of a varied description. It has also visited Washington and had a conference with Mr. Gifford Pinchot, until recently Chief Forester of the United States government. It has been to Ottawa and consulted with timber experts there. The government expects that the report will be ready within the next few months, and at the next session up-to-date legislation to protect the timber wealth of the province will be brought down.

"To guard against the danger of forest fires there is a staff of fifty-three district firewardens, three divisional firewardens, and one chief firewarden. This is nearly double the force of a year ago. The vote for fire fighting is \$75,000. Besides this all road foremen have been appointed as assistant firewardens with instructions from the public works department to put on crews to fight fires in case of necessity, thus giving a good reserve force when required. Other precautions have been taken by way of circulars and making it necessary for settlers to take out permits for clearing, thus helping to check indiscriminate burning. In the new timber bill we hope to incorporate provisions which will considerably reduce the present cost of fire protection, and which will have for their object the conservation of the timber wealth of the province."—*Canada Lumberman*.



Louisiana Commission Appointed

Governor Sanders of Louisiana has signed the commissions of members of the State Commission for the Conservation of Natural Resources, which is composed as follows: Henry Hardtner, Urania, president; Harry P. Gamble, Winfield, secretary; W. E. Glassell, Shreveport; Swords R. Lee, Alexandria; Justin F. Denechaud, New Orleans. Frank M. Kerr, chief state engineer; Fred J. Grace, register of the state land office and commissioner of forestry, and W. R. Dodson, director of state experiments, are ex-officio members of the commission.

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CORRESPONDENCE

Shall Wood Prices Be Raised in Order to Secure Conservation?

A Letter

In considering the important problem of Forestry Conservation there should be some general first principles recognized by all parties concerned. On the one hand, the timber owner naturally wishes to market his product at the lowest possible expense and the usual corporate ownership cannot properly recognize sentimental considerations as against stockholders' interests. On the other hand, we have a general public interest represented by political leaders and also by the few altruistic citizens who give their time and thought for the general interest as they see it. The timber owner must first think of his own interests. Is it not possible that the interests of all might be conserved by one happy solution of the problem?

It is said that timber is being cut off four times as fast as new growth will replace it. There is very little replanting of timber in the country, especially as increase in population turns timber land into farm land whenever feasible. Increase in population also increases the possibility of forest fires. We are certainly approaching a timber famine and other countries are not in position to help us out in any really corrective way.

Now, while value is supposed to be settled by supply and demand, the supply at any period as compared with the demand for a series of years does not necessarily show its proper effect on prices. For instance, supposing our timber supply to actually represent but fifteen years' consumption, there will be timber enough so that the scarcity might not be actually felt for ten years at least and timber owners might accept customary prices during that period. Within the next five years, timber might rise in value several hundred per cent.

Since we cannot, even by replanting, provide a proper amount of new timber within any reasonable period and since the government conservation policy is withdrawing timberland from the market, the only possible regulating factor is the price of timber in the market. Those, therefore, who are conscientiously interested in the problem should favor a rise in price that will not only lessen the demand but encourage the use of concrete and steel construction and also make it possible for the timber owners to possibly use suggested methods of a pro-

tective nature in forestry operations. To bring about this result, there should be an educational campaign which should make the timber owners realize the true value of their holdings, in view of the coming scarcity, and prompt them to demand prices more in conformity with the situation.

An unthinking element of the population might very naturally protest against higher prices for building materials, but the public could better stand a reasonable increase over a term of years, rather than face practically prohibitive prices at some definite future date. There is far more reason for a legitimate increase in the price of timber than for any other raw material. New gold and silver deposits are discovered every day. There is no hidden supply of timber. New wheat fields are being planted in the Canadian Northwest but no new areas of land are being planted with timber. There is some talk about our coal being used up within two hundred years, but this is disputed by those who think that we have several thousands of years' supply in Alaska. Even were coal to be used up in two hundred years, there are plenty of possible substitutes, while we are facing a possible famine in timber within fifteen years and for countless uses there is no substitute.

The writer is financially interested in large timber tracts in the United States, Canada and South America and thus has a more or less selfish interest in the proposition, but this seems to be a case where the selfish interests of the timber owner and the real interests of the whole country are uniform.

Yours very truly,

GEORGE OTIS DRAPER.

New York City.

The main contentions in this communication are two in number: First, that timber owners are justified in demanding higher prices for their wares; and second, that the consumer, if fully informed and enlightened, should be willing to pay the higher prices demanded. Let us examine the interests of the timber owners and of the consumer separately.

1. *The timber owners.* To justify timber owners in advancing wood prices, two

reasons are urged. It is argued, in the first place that higher prices are warranted by the real but hidden condition of supplies. The second reason adduced is that higher prices would enable timber owners to put conservative methods into practice. In this form, we admit the general validity of this argument without hesitation.

2. *The consumer.* It is contended that both prudence and public spirit should induce the consumer to pay more for wood. Prudence counsels him that if he refuses to pay more now he will have to "face practically prohibitive prices at some definite future time" which is near enough to interest him. Public spirit exhorts him on the ground that if he refuses to pay more now he is refusing to contribute his fair share of a legitimate charge for forest conservation in the interest of the general welfare.

This argument is by no means such plain sailing. Before he can fairly be expected to assent to it the consumer has the right to have at least two questions answered. He will want to know how great the advance in price ought to be, and whether the money he takes out of his pocket to pay the difference is actually going to be invested in forest conservation. In order to make out their case, the timber owners must therefore be able to satisfy the consumer by devising and defending a satisfactory machinery for advancing prices; by furnishing some sort of guaranty that the money ostensibly raised for conservation will be used for conservation, and not simply pocketed as profits needed in the business; and by setting some measure of a fair conservation charge.

This is scarcely a seasonable time for approaching the consumer with a proposal to add to the cost of his living, even with the most disinterested motives, and the motives behind this communication are admittedly colored with "more or less selfish interest." As long as the law of supply and demand is actually or apparently fixing the price, the consumer is plucky enough to pay the price. But let the price be raised artificially, and his suspicions are at once aroused. These suspicions will have to be allayed.

Now, obviously the only machinery for raising prices above the level determined by supply and demand is some sort of combination. As long as competition prevails, if A and B advance their prices, C may follow suit, D may undersell, while E, F, and G may withdraw from the market altogether and hold out for a further rise. A general advance all along the line would require concerted action among a sufficient

proportion of the owners. In going to the consumer with such a plan timber owners would have to provide him with the means of protecting himself from extortion; they could hope to persuade him, if at all, only by enabling him to erect safeguards in the form of State regulation and expert supervision of their business.

Having convinced the consumer of the need of advancing wood prices, and placed the control of the advance in his hands, the timber owners would next have to satisfy him as to the amount of the proposed advance and the use designed to be made of it. There is good reason to believe that the amount of the advance would not have to be great. A recent law in Louisiana levies a tax of three-quarters of a cent a thousand on all the lumber manufactured in the state, and the estimated revenue from this source is \$25,000 a year. On this basis, and in that state, a tax of three cents a thousand would produce \$100,000 a year, a sum which would doubtless suffice for a complete protective system for the forests of the state. Again, one of the competent foresters in this country has estimated that a large company could put forestry into practice at an added cost which, expressed in terms of the annual cut, would range from 50 cents to one dollar a thousand feet. Should the timber owners retrench themselves by advancing prices in proportion to these figures, the consumer might never be the wiser and certainly would have slight ground for protest. It seems unlikely however, that such moderate advances, or anything like them, would assuage the "more or less selfish interest" of the timber owners, while markedly greater advances ought to be rigorously scrutinized, lest the swollen profits be wrongfully diverted. Certainly the consumer would properly expect a consideration for his money.

On the whole, we are inclined to assent unreservedly to the theoretical argument that higher present prices for wood are desirable if they should furnish a fund which would actually be expended in defraying the cost of forest protection and production. But we can not conceal from ourselves the practical difficulty of securing, first, strictly legitimate advances, and second, the assurance of good faith on the part of timber owners and the actual reinvestment of the added profits in conservation. Until this difficulty is met, our correspondent's proposal seems likely to have rather rough going with the public. But let the timber owners by all means come forward with a workable plan.—Ed.)

LUMBERMEN AND LUMBER JOURNALS

American Pulp Association on Forestry

As long ago as 1898 the officers of the American Paper and Pulp Association, realizing the importance of maintaining a perpetual supply of pulp wood, devoted the annual meeting of that year principally to a discussion of the science and practice of forestry, then almost unknown in the United States. At that meeting addresses were delivered by Doctor Fernow, then the Chief of the Government Forestry Department, by Gifford Pinchot, his successor, and Austin Carey, recently connected with the Forestry Department of the State of New York. Hugh J. Chisholm, then president of the association, in his annual message said:

"Those among us who have weighed the matter carefully are well aware that if we as a nation are to take and permanently hold the foremost place in paper making, we must begin at once to husband our resources. Fortunately, the science of forestry, until recently but little known, and heeded less, is ready to point out the way, and we shall learn from three of the best authorities in the country, not only why we should but how we may put in practice the principles of forestry. I hope that every one will go away resolved directly or indirectly to do what he can to secure a rational use of this mainstay of our business."

The attitude of the association, in the past twelve years, has been to exert its influence in every way possible in the encouragement of forestry conservation. Every year resolutions have been adopted urging timberland owners in the paper industry to practice conservative methods, and at the same time attention has been called to the vital importance of preventing forest fires, and in more recent years the subject of taxation of timberlands has also received attention.

Not only has a universal sentiment in favor of conservation been created in the industry, but practical results have been accomplished. It is not too much to say that our timberland owners, with possibly here and there an exception, have been for a number of years all conducting their operations so as not to impair the reproductive capacity of their lands. In the first place, they have carefully studied their holdings, in many instances being assisted by the Forestry Service at Washington. They have thus become enlightened as to how far cutting timber can go without jeopardizing the

future. In the next place, they have voluntarily limited the size or the diameter of trees, below which no cutting shall be done. They have very generally, although to just what extent cannot be definitely estimated, adopted the method of felling trees with the saw instead of the axe, and have in other ways sought to bring the waste down to a minimum. But perhaps in no way have they done better service than by encouraging legislation and the enforcement of it for the prevention of fires.

It is roughly estimated that the paper makers own in the United States about 5,000,000 acres, consisting mostly of spruce timberlands. While this is insufficient to afford a natural growth equal to the demands, the deficit is made up by purchases in the United States and by importations from Canada and the use of other kinds of wood. There is still much more spruce cut for lumber than for pulp wood, but the paper makers are continually adding to their holdings, and there appears to be a readjustment of prices going on which is leading to the substitution of pulp wood production for lumber production.

The example set by paper makers is being followed by other timberland owners, so that we may confidently say that no timberlands of any moment are in any sense being denuded for the production of pulp wood. Less than 2 per cent. of the consumption of wood in this country is domestic pulp wood, and with a continuation of the conservative methods now in vogue, there need be no fear of diminution of our forests by the paper industry. In fact, the perpetuation of the industry in the United States depends largely upon the perpetuation of the forests of the United States, so that the paper manufacturers have every incentive to maintain them. The use of hemlock and other kinds of wood for pulp making has greatly increased, thus tending to relieve any drain there might be upon the supply of spruce. As most of the paper mills are dependent upon water power, the manufacturers have still further incentive to protect the watersheds.

The Forest Commission of Maine has stated:

"Since the advent of the pulp and paper industry in Maine, covering a period of less than twenty years, the system of handling our forest lands has been completely revolutionized. Prior to ten years in cutting logs in the woods, it has been demonstrated by actual tests and measurements that only

from 60 to 65 per cent. of the volume of the lumber trees actually cut was saved and utilized for lumber purposes, while since that period on account of the paper industry it has been demonstrated by later measurements and experiments that from 80 to 85 per cent. of the volume of lumber trees is actually utilized, and what is of far greater importance is the fact that crooked, seamy and defective trees, as well as all of the undersized trees formerly cut and destroyed in swamping and in making yards and landings, are now all utilized. * * * Fully one-half of the whole territory of Maine has never as yet produced one single log for pulp and paper production. I refer to the St. John River drainage, where the same wanton system of lumbering, although possibly in a somewhat lesser degree, is being followed as was followed through the long period from 1860 to 1900. Were this territory fully developed for lumbering by means of proper railroad connections or water facilities it is safe to assert that conservatively managed, as the paper companies are endeavoring to do today with the best knowledge obtainable, it would supply the entire demand for all the mills now located in Maine indefinitely."

In the State of New York all the paper makers who own lands in the Adirondacks have an association including many other lumbermen, which has co-operated with the state authorities in securing legislation which would foster conservative cutting and the prevention of fires.

The International Paper Company, owning nearly a million acres of forest lands in New England, New York State and elsewhere in the United States, has always conducted its operations with a view to the future supply. In eleven years this company has cut less than two-tenths of a cord per year per acre, which is believed to be less than the natural growth. Two years ago this company started a nursery in Vermont, and each year it has been putting in transplants in increasing quantities in Maine, New Hampshire, Vermont and New York State, supplementing its own supply by purchases of seedlings and transplants at home and abroad. This replanting is being done on abandoned farms, pasture lands and burns. On their other holdings no replanting is necessary, as there is always sufficient growth left for reproduction. Some other companies have done replanting, but in general, conservative cutting and protection from fire render extensive planting unnecessary.

The paper industry has acted on its own initiative, and while self-interest may have actuated it, the result is none the less beneficial from the public point of view, and the policy is more apt to be followed permanently than if impractical laws, attempting to make conservation compulsory, were passed.

E. W. BACKUS,

Delegate to the National Conservation Congress, St. Paul, Minn., September 5 to 9, 1910.

NEWS AND NOTES

Invested in Pulp

According to the *Pioneer Western Lumberman*, ten million dollars will be required to pay the army of lumbermen at work in the forests of the Northeast—Maine, New Hampshire and Vermont, and the provinces of New Brunswick and Nova Scotia—this coming winter. There are in this peaceful army of loggers 70,000 men. They are accompanied by 22,000 horses, and the fruits of the campaign will not be fallen capitals and confiscated territory, but a crop of 2,500,000,000 feet of pine, cedar, spruce, hemlock and birch. In Maine the harvest for pulp mills will reach the enormous total of 350,000,000 feet.

Coopers Demand Forestry

A report was submitted by a committee on forestry at the recent semi-annual meeting of the National Coopers' Association, in Chicago. The report declares that "only the application of forest knowledge, with wisdom, method and energy, in the next ten years can prevent the starving of national industries for lack of wood. In America forestry has passed through the experimental stage and is in a position to accomplish much needed results. But action, immediate and vigorous, must be taken if the inevitable famine of wood supplies is to be lessened. We are now using as much wood in a single year as grows in three, with only 20 years of virgin growth in sight."

Southern Conservation Congress

Out of a plan to call together leaders of conservation in the State of Georgia for the purpose of forming a Georgia conservation association, has developed the larger project of a Southern Conservation Congress at Atlanta, October 8 and 9, to discuss the problems of utilizing to the best permanent advantage the resources of the South as a whole. This congress, coming as it does almost at the close of the Appalachian Exposition at Knoxville, emphasizes the earnestness of purpose and the progressive spirit in which the Southern people are apparently determined to deal with their immense natural advantages.

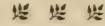
Theodore Roosevelt, Hoke Smith, Governor-elect of Georgia, Gifford Pinchot, Dr. Harvey W. Wiley, Chief Forester Henry S. Graves and other leaders of the conservation movement of national reputation have accepted invitations to address the congress.

Governor Brown, of Georgia, will open the first day's meeting and the mayor of Atlanta, Robert F. Maddox, will follow with an address of welcome. Gifford Pinchot will address the congress on the "Principles of Conservation," and Charles S. Barrett, president of the Farmers' Union, who has been a leader in the movement in Georgia, will speak on the "Conservation of Farm Resources." Among those to address the congress at other sessions are the following: B. N. Baker, the retiring president of the National Conservation Congress; Dr. C. Willard Hayes, chief geologist, United States geological survey; Dr. A. M. Soule, president of the Georgia State Agriculture College; H. S. Graves, chief forester of the United States; Dr. W. J. McGee, soil-water expert, United States Department of Agriculture; Frederick J. Paxton, president Atlanta Chamber of Commerce; Paul Norcross, Atlanta; Dr. H. F. Harris, State Board of Health; K. G. Matheson, president Georgia School of Technology; Rev. C. B. Wilmer and Rev. J. W. Lee, Atlanta; Mrs. H. M. Willett, Atlanta; Dr. Alfred Akerman, professor of forestry, University of Georgia; Mrs. J. K. Ottley, Atlanta, and Dr. Joseph Hyde Pratt, president Southern Appalachian Good Roads Association.

Secretary James Wilson, of the Department of Agriculture; Henry Wallace, of Iowa, the new president of the National Conservation Congress; Governor Stubbs of Kansas; former Governor Blanchard, of Louisiana, all the governors of the southern states and various state officers and mayors of cities have been invited to attend, and a number of them are expected to have a place on the program.

Land and Irrigation Exposition at Pittsburgh

There will be held in Pittsburgh, October 17 to 29, a Land and Irrigation Exposition, at which the Forest Service will have a forest exhibit in charge of a representative who will deliver illustrated lectures daily upon various forest topics.



E. E. Carter, assistant forester in the U. S. Forest Service, has resigned to accept the position of assistant professor of forestry in the Harvard Forestry School. He has already taken up his new duties.



To Salvage Timber from Idaho Fires

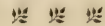
According to the *Paper Mill*, millions of feet of good pulp wood which a month ago was thought lost in the forest fires in the Idaho "panhandle," will be saved, together with billions of feet of lumber logs, by an organized movement to salvage the fire swept district. In the hope of saving at least 90 per cent. of the timber left standing in this district, a combination of lumber and land companies will log off thousands of acres of this land within the next two years and store the logs in Cœur d'Alene Lake.



Inventory of Canadian Forests

The Canadian Commission for the Conservation of Natural Resources, of which the Hon. Clifford Sifton is the chairman, has planned an extensive program of work for the various committees which constitute that body. An effort will be made by the committee on forests to get together the best available information in regard to timber still standing, its quantity, its quality, acreage, and the acreage owned respectively by private individuals, the provinces and the Dominion.

The committee will also make a study of the results which would attend the prohibition of the export of logs.



The Indian Forest Service

The recently organized Indian forest service, with a view to assisting the Indians to obtain the greatest benefit from the forests on their reservations, is formulating extensive plans for the operations during the current fiscal year. The new service is in the Department of the Interior. The proceeds from the sale of timber produced on the Indian forest lands are used solely for the benefit of the Indians and the greater portion of the \$110,000 which the service plans

to spend on the Indian forests will be used in the care and protection of the forests. Timbered lands on the Indian reservation are estimated at about 24,980,200 acres, having an approximate value of \$92,000,000. The logging operations carried on within the Indian forests during the fiscal year ending June 30, 1910, resulted in the production of 195,918,530 board feet of lumber with a value of \$1,293,926.



Tree Planting on Australian Farms

The necessity of replacing, to some extent, the lost forests of the world is becoming more urgent every year—in Australia not less than in other countries. In the preface to his "Annual Catalogue of Trees for Free Distribution, 1910-11," Mr. Walter Gill, conservator of forests, says: "It matters not whether we regard it from the standpoint of the protection trees afford against the wind, or from that of the grateful shade they provide in the trying heat of the summer; whether we consider their function as factors in beautifying the landscape, or dwell on their great value as producers of commercial lumber—regarded from whatever aspect may be chosen, they are a source of ever-increasing interest." It is worthy of note that last year the total number of trees distributed amounted to 317,204, the number of applicants for which was 1,996. A thousand catalogues were issued, containing the usual information as to methods of planting, description of trees, and numbers obtainable. Trees have now been issued *gratis* by the department for twenty-eight years, and during that period 36,994 applications have been received, in response to which a total of 7,583,729 trees have been distributed. The catalogue contains directions for planting—a most important subject, if success is to attend the operation; the conditions upon which young trees will be distributed, a list of the seven state nurseries for the guidance of intending applicants, and a brief description of the trees available.—*South Australian Journal of Agriculture*.



Largest Cut of Yellow Pine

Statistics reviewed by *The Southern Lumberman* show that while the production of yellow pine is the greatest in the history of the trade, this production is being exceeded by the shipment. As compared with 1907, the banner year in the yellow pine trade, production for the first six months of this year shows a net increase of 213,347, 346 feet, or 15.1 per cent. For the same period shipments have exceeded cut by 78,429,951 feet, or 5.5 per cent.

Striking Figures of Waste

At a recent meeting of the National Lumber Manufacturers' Association, Captain J. B. White, an authority on forests and lumber, said:

"In the South we are cutting over two and a quarter million acres of Yellow Pine every year, or about 7,500 acres every day, producing 13,000,000,000 feet of lumber each year, and 20 per cent waste makes the enormous sum of 2,600,000,000 feet of lumber. This means loss to the transportation companies in freight of 173,000 carloads each year, and at \$7 a thousand means an annual loss to labor of \$18,200,000. And in the entire nation we are cutting 40,000,000 feet annually, leaving 8,000,000 acres a year of cut-over lands, and a total waste from unsalable low grades of at least 6,000,000,000 feet, or half a million carloads annually lost to the country. Add to this the estimated loss of \$50,000,000 by fires every year, and we have a total loss to the nation and to the world of over \$100,000,000 per annum."



Canadian Conservation Pioneer Dies

The New York *Paper Trade Journal* says that in the death of Monsignor Laflamme, rector of Laval University, Quebec, Canada has lost one of her very ablest scholars and most devoted patriots. He threw himself with a whole heart into the problem of the conservation of natural resources. He realized with unerring instinct the vital importance of the preservation of Canada's forest assets, and his work in the field will be gratefully remembered by the pulp and paper manufacturers of Canada, and particularly those of Quebec. There is no doubt that the plea he put forth for the preservation of the forests of Quebec had a most important bearing on the policy that has since been adopted by the government and on the grasp which the people of Quebec now have of this question.



A Club Woman on Florida Forestry

Mrs. Kirk Monro, writing in *The Florida Housekeeper*, says:

"Florida forestry is beginning to be what some time will be a great work. I like to think that Florida was among the first to have timber reserves, and now again she is coming forward with her two national forests, aided by the splendid work of the woman's clubs and civic societies of the State.

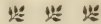
"It is true we have only begun the work, but it is a great beginning and the people we are most anxious to interest are beginning to look up and listen and answer. If we go back to the beginning of forestry

work in this country we find that it began in Florida by Congress appropriating in 1825 the sum of \$10,000 to buy live oak lands on the Santa Rosa Sound, in Western Florida, and subsequently other Florida lumber lands.

"Young oaks were planted on the Santa Rosa lands, but there was much difficulty in inducing the young trees to grow, and finally a large quantity of acorns were planted, a fair proportion of the crop coming to perfection.

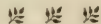
"But even at that time the chief efforts of the foresters were directed toward pruning, training and caring for the wild trees. All this was done that we might have timber to build war ships. Then came the civil war and brought a complete change in war vessels by substituting iron for wood, and forestry work was stopped.

"The timber lands were neglected and soon began to be occupied by squatters, and after a number of years all reserves except some of the Florida lands were opened to settlers. As long ago as 1885, 25 years ago, a Congress of Forestry was held at De Funiak Springs, at which Professor A. H. Curtis read a paper on the forest trees of Florida. Professor Curtis enumerated 202 native trees."



Beech Leaf Moth in Massachusetts

Considerable damage is being done in Massachusetts by the beech leaf skeletonizer known as *Bucculatrix canadensisella*. No permanent injury to the trees is anticipated, since past outbreaks, like that of 1901, have been quickly suppressed by natural enemies.



To Conserve Lake George Region

The Lake George Association will lay before the New York legislature at its next session plans for conserving the forests and streams of the Lake George region, by making it either a part of the Adirondack Reserve or a separate park.

Teak Forests of Siam

The great teak forests of Siam are in Payap or northern Siam and in the upper parts of the Nakonsavan and Pitsanuloke provinces. The teak tree grows scattered among trees of many species at an elevation not exceeding 2,500 feet, and prefers the hill-sides and comparatively dry land in districts where the average annual rainfall does not exceed fifty inches. The total exports of teak from the port of Bangkok, Siam, are nearly 8,000,000 tons, valued at over four and one-quarter million dollars. It ranks second in the exports of Siam.

The survey of these forests was begun in 1907 and is not yet finished. They are now under the supervision of a well organized forestry department, based on the India-Burmese system, with trained European officers in charge. Only trees of seventy-six and one-half inches girth can now be girdled or barked near the ground and a certain number of trees must be left untouched within a given area to seed the ground for future. After being girdled the tree soon dies and is left standing to season for about two years. It is then cut down, dragged by elephants or buffaloes to the nearest stream, and floated to Bangkok or Moulmain. The teak industry forms one of the most important resources of the country and thousands of people are engaged in cutting, hauling, and rafting the teak logs to the Bangkok markets and saw-mills.

The chief uses for this wood are for ship-building, furniture, the better class of wooden houses, and rolling stock. Besides its hardness and durability, it contains an oil which prevents the rusting of iron or steel imbedded in it, and it is not attacked by the white ant, which is so destructive to other woods in the tropics. Forestry in Siam, however, is by no means limited to teak, as many other valuable woods are found in the extensive forests, both in the north and south of Siam.

—Exchange.



STATE FOREST OFFICERS

Important changes have taken place during the past year in both the organization and the personnel of the state forest departments, and similar changes are taking place constantly. In order to record the progress made, as well as to invite corrections and make the list complete and accurate, a table of state forest officers, with their titles and addresses, is printed below:

State or territory	Name and post-office	Official position
Alabama.....	John H. Wallace, Jr., Montgomery.	Commissioner, department of game and fish.
California.....	G. M. Homans, Sacramento.....	State forester.
Connecticut.....	S. N. Spring, New Haven.....	State forester.
Hawaii.....	Ralph S. Hosmer, Honolulu.....	Superintendent of forestry.
Indiana.....	Charles C. Deam, Indianapolis.....	Secretary, state board of forestry.
Iowa.....	G. B. MacDonald, Ames.....	Forester, agricultural experiment station.
Kansas.....	Chas. A. Scott, Manhattan.....	State forester.
Kentucky.....	M. C. Rankin, Frankfort.....	Commissioner, department of agriculture, labor and statistics.
Louisiana.....	F. J. Grace, Baton Rouge.....	State forest commissioner.
Maine.....	Edgar E. Ring, Augusta.....	Land agent and forest commissioner.
Maryland.....	F. W. Besley, Baltimore.....	State forester.
Massachusetts...	F. Wm. Rane, Boston.....	State forester.
Michigan.....	Marcus Schaef, Roscommon.....	State forester.
Minnesota.....	Filibert Roth, Ann Arbor.....	State forest warden.
Montana.....	Gen. C. C. Andrews, St. Paul....	Forestry commissioner.
Montana.....	Charles W. Jungberg, Helena....	State forester.
New Hampshire...	E. C. Hirst, Concord.....	State forester.
New Jersey.....	Alfred Gaskill, Trenton.....	Secretary, forest park reservation commis- sion, and forester.
New York.....	{ James S. Whipple, Albany.....	Commissioner, forest, fish and game com- mission.
	{ C. R. Pettis, Albany.....	Superintendent of state forests.
North Carolina..	J. S. Holmes, Chapel Hill.....	Forester.
Ohio.....	Edmund Secrest, Wooster.....	Forester, state agricultural experiment sta- tion.
Oregon.....	{ J. W. Baker, Cottage Grove.	Forestry, fish and game warden.
	{ A. B. Wastell, Portland.....	Secretary, state board of forestry.
Pennsylvania....	Robert S. Conklin, Harrisburg...	Commissioner of forestry.
Rhode Island....	Jesse B. Mowry, Chepachet.....	Commissioner of forestry.
Tennessee.....	H. A. Morgan, Knoxville.....	Director, college of agriculture and ex- periment station.
Vermont.....	Austin F. Hawes, Burlington....	State forester.
Virginia.....	G. W. Koiner, Richmond.....	Commissioner, department of agriculture and immigration.
Washington...	{ R. W. Condon, Port Gamble.....	Chairman, state board of forest commis- sioners.
	{ J. R. Welty, Olympia.....	State firewarden and forester.
West Virginia...	A. B. Brooks, Morgantown.....	State forester.
Wisconsin.....	Edward M. Griffith, Madison....	State forester.

STATE FORESTRY ORGANIZATIONS

A list of state forestry associations and their secretaries is printed below. Corrections in this list will be carefully recorded by AMERICAN FORESTRY.

Name of organization	Secretary	Address
Appalachian Mountain Club.....	R. B. Lawrence.....	Tremont Bldg., Boston.
Arizona—Salt River Valley Water Users' Association.	Charles A. van der Veer..	Phoenix.
California—Water and Forest Association...	I. C. Friedlander.....	1405 The Merchants Exchange Bldg., San Francisco.
Forestry Educational Association.....	E. C. Damon.....	San Diego.
Sierra Club.....	William E. Colby.....	San Francisco.
Pacific Coast Forest, Fish and Game Association.	Wm. Greer Harrison...	San Francisco.
Tri-counties Reforestation Committee.....	Miss L. A. Finch.....	Riverside.
Colorado Forestry Association.....	Ellsworth Bethel.....	Denver.
Connecticut Forestry Association.....	F. H. Stadtmüller.....	Elmwood.
Georgia Forestry Association.....	Alfred Akerman.....	Athens.
Iowa Park and Forestry Association.....	Welsey Greene.....	Des Moines.
Louisiana Forestry Association.....	Mrs. A. B. Avery.....	Shreveport.
Maine Forestry Association.....	Edgar E. Ring.....	Augusta.
Massachusetts Forestry Association.....	Irving T. Guild.....	4 Joy St., Boston.
Michigan Forest Association.....	H. G. Stevens.....	25 Band Chambers, Detroit.
Minnesota State Forest Association.....	E. G. Cheyney.....	St. Anthony Park.
Nebraska Park and Forestry Association...	Miss Leila B. Craig....	York.
New England Forest, Fish and Game Association.	Arthur T. Harris.....	16 State St., Boston.
New Hampshire—Society for the Protection of New Hampshire Forests.	Allen Hollis.....	Concord, N. H.
New York—American Forest Preservation Society.	Geo. Milroy Bailey....	Corfu, N. Y.
Forestry, Water Storage and Manufacturing Association of the State of New York.	Chester W. Lyman.....	1 Broadway, New York.
Northern New York Forestry Association..	O. B. Trappan, Director.	Potsdam, N. Y.
State of New York Fish, Game and Forest League.	L. C. Andrews.....	Elmira.
The Association for the Protection of the Adirondacks.	Edward Hagaman Hall.	Tribune Bldg., New York City.
North Dakota State Sylvaton Society.....	Miss Ella J. Mitchell...	Penn.
Ohio—Cincinnati Forest and Improvement Association.	Adolph Leue.....	127 West Twelfth St., Cincinnati.
Ohio State Forestry Society.....	Prof. J. J. Crumley....	Wooster.
Oregon Conservation Association.....	A. B. Wastell.....	904 Lewis Bldg., Portland.
Pennsylvania—Franklin Forestry Society...	W. G. Bowers.....	Chambersburg.
Pennsylvania Forest Association.....	F. L. Bitler.....	1012 Walnut St., Philadelphia.
Vermont Forestry Association.....	Ernest Hitchcock.....	Pittsford.
Washington Conservation Association.....	Clarence H. Bailey....	P. O. Box 236, Seattle.
West Virginia Forestry Association.....	A. W. Nolan.....	Morgantown.

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NOVEMBER

1910

The Forest Fires of 1910

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EDITORIALS
and
DEPARTMENTS



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November

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Indexes for Vol. XV (1909) are ready and may be had on application

The American Forestry Association

is a national organization composed of public-spirited citizens who are interested in the prevention of the wholesale destruction of our forests, in forest extension and utilization, and in the fullest cooperation of national, state, municipal, and private agencies for these purposes. The Association has no business or governmental ties or alliances. Its work is to educate the people to know and understand the value and necessity of forests in the Nation's life and the way to maintain them to the best advantage through scientific forestry; and to bring about such wise legislation as will best secure the desired results. It is the people's forestry advocate and the representative of forestry before the people.

DEPARTMENTS OF WORK

MAGAZINE DEPARTMENT.—This department publishes **American Forestry**, the only popular monthly magazine of national circulation in its field. It has a strong force of editors and contributors and is well illustrated. The subscription price is *two dollars* a year.

EDUCATIONAL DEPARTMENT.—Series of educational and general bulletins and leaflets will be issued at intervals. These will be sent to all members and will be provided for distribution at a nominal cost. The first numbers of the general series are a brief summary of the history and need of the project for National Forests in the southern Appalachian and White mountains; the record of the vote on the Weeks bill, looking to that end, in the Sixtieth Congress; and a part of the argument for the Appalachian forests by the President of the Association, Hon. Curtis Guild, Jr., in his annual address for 1910.

LECTURE SERVICE.—It is proposed to establish a lecture service through which reliable lecturers upon forestry subjects may be obtained. This bureau will arrange with able lecturers at central points who will be available for lectures, with illustrations if desired, before clubs, associations, boards of trade, or general audiences.

CORRESPONDENCE BUREAU.—Through this bureau the Association will furnish information on forestry when possible and provide advocates of the cause with material.

LEGISLATION DEPARTMENT.—As it has always done, the Association will use the agencies at its command to secure the passage of wise legislation in furtherance of its great purpose. Its national character and the location of its main office in Washington enable it to keep in close touch with national legislation and it will cooperate, when practicable, with forestry workers in the several states to promote good state legislation. Its first and most important object in legislation is the passage of a measure for the creation of National Forests, with especial reference to the southern Appalachian and White mountains.

The development of these lines of work to their highest usefulness requires the maintenance of a considerable staff and an expensive plant. Contributions for the work, or for any particular phase of it, are always welcome. The income of the Association by which its general work is supported is derived from membership fees, which are as follows: **Annual members, one dollar yearly; contributing members, ten dollars yearly; sustaining members, twenty-five dollars yearly; life members, one hundred dollars, and patron members, one thousand dollars**, the two latter being exempt from further payments.

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EDWIN A. START, Executive Secretary.

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A PICTURE THAT TELLS ITS OWN STORY.—IDAHO

American Forestry

Vol. XVI

NOVEMBER, 1910

No. 11

FUNDAMENTALS OF THE FIRE PROBLEM

By HENRY S. GRAVES

Forester, U. S. Department of Agriculture

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At the request of AMERICAN FORESTRY, Mr. Graves was kind enough to set forth in the following brief statement the main difficulties in the way of protecting forests from fire, the general status of protective measures throughout the country, and the things which must be done if the waste of forest resources through fire is to be promptly and effectively checked.—Ed.)

NO SINGLE forest problem is so important as fire protection, for the risk from fire to-day stands as a great obstacle in the way of the practice of forestry. In the National Forests, the first work has necessarily been to organize the Forests for administration and protection, and this work has considerably retarded the development of the work of silviculture. As for private holdings; the main reason why forestry is not more widely practiced is the danger that the required investment may be lost or seriously impaired by subsequent fires.

The agitation for forestry and forest protection has now been carried on for many years, and the principles of forestry have been endorsed by the public. But the problem of getting the known and approved protective principles carried into actual practice is as yet far from solution. This has been clearly demonstrated during the past season, in which the loss from fires will prove to have been greater, perhaps, than ever recorded before.

The bulk of the public forest land in the United States is now included in the National Forests, which are already well organized and are managed by an administrative and protective force. The protective force is, however, inadequate for a complete and effective control of fire. What is first required is a rapid extension of the system of trails, fire lines, and telephone lines. Considerable public expenditures are of course needed for this improvement work, as well as for increased patrol. When the value of the property and the benefit to the forests and to the public are considered, such expenditures, however, would amount to a cheap insurance.

With private forests, which comprise about 80 per cent of the forests of the country, protection presents a much more difficult problem. Individual owners of large tracts are often able and willing to establish systems of fire protection, and where most of the land is held in such large holdings it is often feasible to secure organized protection by cooperation. Cooperative protection of this kind is being successfully carried on in Montana, northern Idaho, Washington and Oregon, and in certain parts of northern New England.

But when there is a great area of wild land, a large part of which is in the form of small private holdings whose owners are men of small means or are non-residents, the difficulty of securing organized cooperative protection is very great. Until now, efforts in this direction on private land in wild forest regions have been confined to the larger owners.

In the systematic protection of private forests by the states but little progress has been made. To be sure, some states have a system of fire wardens whose duty it is to collect a force of men and attack such fires as may be started within their respective districts; and a great deal of loss from fire has been prevented by such systems. But it is a fundamental principle in all forest fire protection that there must be an organization to prevent the starting of fires, and not merely one designed to put fires out after they get a start. Private forests cannot be fully protected until the individual states assume their responsibilities and establish at public expense effective systems of forest patrol. The states need not and should not assume the entire burden of protecting private lands, but they should maintain a state patrol system, with one or more men for each township whose duty it should be to patrol forest lands during the dry season. Such patrolmen should have all necessary authority in matters pertaining to protection. Private owners will supplement this system with such a force of men as will make the forests safe.

In New York the state preserves are patrolled, but the system does not extend to the entire state, and private lands within the preserves are the only private lands directly benefited. In Maine and in New Hampshire, lumbermen, either independently or with the state, have done much to establish systems of watch-towers.

The main burden of protecting forests from fire must be borne by the public. The purpose of forestry is to secure certain benefits to the community and to the country as a whole. It is therefore entirely proper that the principal cost of protecting our forests should fall upon those who are benefited.



HOW THE FIRES WERE FOUGHT

By F. A. SILCOX

Assistant District Forester, District 1, U. S. Forest Service

(Forests in District 1 were the scene of the terrific fires which, in the absence of sufficient trails and equipment for communication and fire fighting, were swept beyond control by the cyclonic winds of August 20 and 21 and, besides devastating some of the finest virgin timber in the country, cost the lives of seventy-four of the temporary force, injured many other persons, destroyed many millions of dollars worth of property, and lost to industry hundreds of thousands of dollars more in wages. Every circumstance which attended the origin and behavior of these fires proved beyond all doubt the ability of the Forest Service completely to protect the National Forests as soon as the Forests are fully equipped and manned for protection—and not before.—Ed.)

CHARACTER OF THE COUNTRY

District One of the Forest Service, with headquarters at Missoula, Montana, includes all of the National Forests in the panhandle of Idaho and in Montana, North Dakota, Minnesota, and Michigan. It includes 28 National Forests with an aggregate area of 29,918,043 acres. The main continental range, from whose crest the rain and snow waters make their way westward to the Pacific and eastward to the Gulf, divides the district into two natural divisions. A striking contrast exists in the type and character of the country on the east and west of the divide; and this contrast has such a vital bearing upon the fire situation that in order to understand the great fires of the past summer and the difficulties encountered in controlling them, a clear picture of the respective types of country is essential.

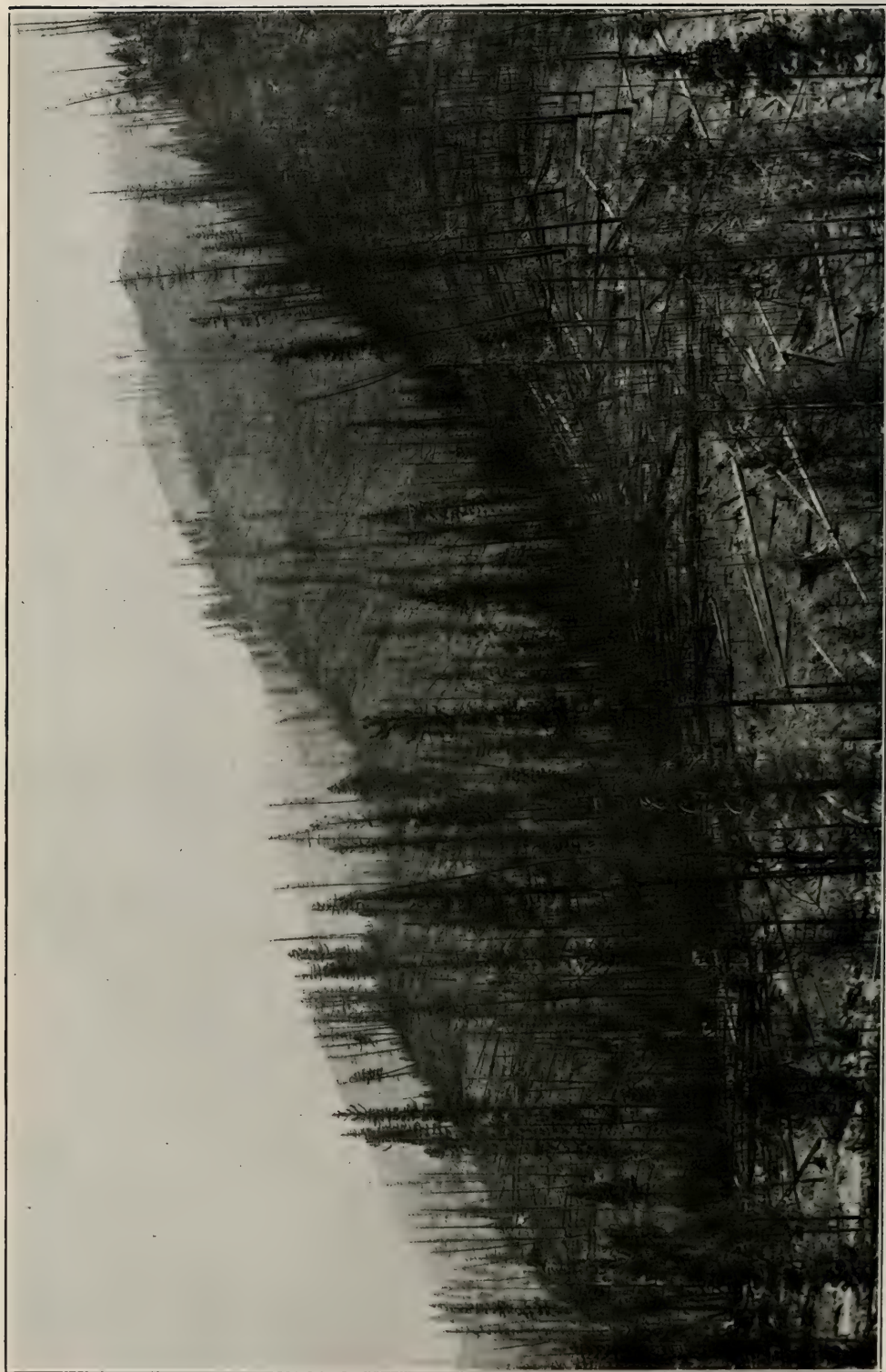
East of the divide the timbered areas are broken by open parks, the solid bodies of timber being confined mainly to the north slopes. The predominating species, lodgepole pine, although forming extremely dense thickets in early life, opens up somewhat as the stands grow older and carry little underbrush. The red fir and yellow pine types are open stands in which little undergrowth is found and through which travel is fairly easy. In this type

of country it is possible to travel at a fairly rapid rate, either on foot or with horses, by working through the timber and open parks and along the bald ridges.

SLOWNESS OF TRAVEL

In striking contrast is the country west of the divide, which includes in this district Northwestern Montana and Northern Idaho. Heavy dense timber with heavy undergrowth and with very few, widely scattered mountain meadows, is the characteristic type of country. The predominating species are Western white pine, cedar, larch, fir, and hemlock, all of which grow in dense stands and through which, both on account of the underbrush and windfallen timber, travel with a horse is, without trails, a physical impossibility, and by foot, with a pack on one's back, a most arduous and tedious task.

Where open areas occur and travel is possible, even without trails, as in the forests of Eastern Montana, fires can be controlled if sufficient patrol is maintained during the dry season, largely because the fires can be reached shortly after being discovered. The best proof of this is the fact that no fires of any size got beyond control even during the very dry and windy season just closed, east of the divide. Many fires occurred,



FIRE HAVOC IN THE BITTERROOT MOUNTAINS

but were reached and quickly put out or trenched and brought under control before attaining serious proportions or doing any large amount of damage. The point is that these fires were discovered and reached very shortly after they started, and were, therefore, controlled with comparative ease.

DIFFICULTY OF FIRE CONTROL

Fire control in such a territory, however, as the dense forests of western Montana and northern Idaho, is a most serious and difficult problem. All the big fires of this year occurred in this type of country, for very obvious reasons—the density and unbroken character of the timbered areas and the extreme difficulty and in many instances impossibility of getting to the fires when they were small.

There is only one way to meet this problem with any degree of success, and that is by increased patrol in the heavily timbered areas, with means of rapid transportation and communication in the form of trails and telephone lines. Fires must be discovered when they are small. Discovery, however, is but one factor, and although a most important one, it availeth little if after a fire is discovered it is impossible on account of inadequate transportation facilities to get to it. This is exactly what occurred during the past season. Many fires were discovered by patrolmen, but before even they themselves could get to them assumed proportions which made a large crew and an organized fire camp necessary.

In many cases twenty or thirty miles of trail had to be cut before supplies and men could be put in to check the fire. Five miles per day is a high average for trail work, which in country of this character is the very roughest kind. The only available means of transportation is by means of pack horses, and in order to use even this method trails are absolutely essential.

Only one other known method can be used, to pack the supplies and equipment on man-back, but here, too, trails must be had. It is possible, of course,

for a man to meander his way through the brush and windfalls with a 30 or 35 pound pack on his back, but when a number of the large mountain fires are 15 to 100 miles distant from railroads, and in many cases without trails, a man cannot be expected to make his way by hard work through the tangle of brush and dense forest at the rate of 10 or 15 miles a day and then be ready to fight fire when he reaches the scene of action. He is too badly in need of a rest before tackling the hard trenching work on a fire. Fresh men must be had in order to be effective. With a comprehensive, well-coordinated system of trails and telephone lines this can be accomplished.

THE PROTECTIVE FORCE

Each National Forest under the jurisdiction of a Forest Supervisor, with his Deputy and Forest Rangers and Forest Guards, is a unit of 1,000,000 or more acres, in some cases more than 2,000,000 acres. This means a tract of land about 75 miles long by 40 to 50 miles in width, or from 1,800 to 3,500 square miles. The country is rough and mountainous and hard to travel over.

An adequate patrol force for the heavily timbered forests should contain at least one man to every 30,000 acres. On the more lightly timbered forests east of the divide one man to every 50,000 or 60,000 acres has proved sufficient. To patrol this area good look-out points on the prominent peaks are selected, from which it is possible to see a large scope of country. Trails along open ridges are used wherever possible in connection with these look-out points.

Another important part of the protective work is the patrol of trails frequented by campers and hunters. Constant patrol during the dry season along the rights-of-way of railroads traversing the forests is one of the most important features of this work.

EQUIPMENT REQUIRED

With a well-distributed patrol force and a coordinated system of trails and telephone lines, the question of location and control is largely covered with one



Back-firing in the Bitterroot Mountains

exception—equipment. As a fire department in a city maintains engines, men, and horses, as a form of insurance against loss of city property, in no less degree is it necessary to be adequately equipped to meet a fire in the forests. There must be men, tools, and pack-trains immediately available if the fire is to be controlled, and it must be reached when it is fairly small.

During the past fire season there were at one time in the field in Northern Idaho and Northwestern Montana, on the National Forests, approximately 300 hired pack horses. This, of course, was during the very worst conditions, when the woods were as dry as a tinder box and fires badly scattered. The securing of these pack-trains was one of the chief sources of delay in getting men and supplies to the fires. By equipping each Forest with horses where transportation facilities make it imperative, this delay can be largely obviated. In addition to the horses, caches of tools,

consisting of shovels, mattocks, axes, and saws, are distributed throughout the Forest. These emergency caches are for equipping at least 10 men.

UNCOMMONLY DRY SEASON

Usually the fire season begins about the latter part of July and lasts through August and early September. This year no spring rains occurred and the country began to get dry by early June. Steps were taken to prepare for a bad year. Extra patrol was put on. Cooperation was planned and effected with railroads and lumber companies, and people were warned to be very careful about burning brush to clear land. In spite of all precautions, fires originated from the burning of brush, from locomotives and logging engines, from campers, and from lightning.

The practically unbroken drouth during June, July, and August was accompanied in many localities by dry elec-



Pack Train in the Bitterroot Mountains

trical storms and almost incessant high winds. By the fifteenth of July serious fires were burning on nearly every Forest west of the continental divide, and many more starting every day.

EMERGENCY FORCE AND EQUIPMENT

By the middle of July over three thousand extra laborers were employed on the fire lines in Northwestern Montana and Northern Idaho. This force had been secured, equipped, and organized for work in the space of from two to three weeks. The labor markets of Missoula, Spokane, and Butte had been called upon, and furnished the bulk of the men. Tools, thousands of mattocks, shovels, and axes, were drained from the mercantile stores wherever available, until their supplies were exhausted and special orders had to be rushed through in order to complete the equipment of the men.

The country had been scoured for pack animals, and trains of from 5 to 40 horses each secured to transport the supplies and equipment of the fire fighters into the hills. The heavily timbered country afforded practically no feed for the horses, and the packing of horse feed, besides the supplies and equipment, had to be provided. Experienced packers had to be obtained to handle these trains in the hills. Any one familiar with western mountains will appreciate the importance of this one item alone.

The inaccessibility of the territory lying immediately contiguous to the Idaho-Montana divide in the Clearwater and Cœur d'Alene Forests made it necessary to equip the pack trains in Montana and have them drop over the divide on to the Clearwater and St. Joe River drainages. Trails from the Montana side were accessible, but when the top of the divide was reached, in most cases trails had to be cut to get the pack horses through. With this done and

the camps established in the field near the bigger fires, reconnaissance to locate any other fires had to be made. Fires were located, but owing to the impossibility of getting a pack train and supplies into them without trails, they had in some cases to be left burning.

FATAL DELAYS

With adequate patrol, trails, and telephone communication, these fires ought to have been discovered and somebody been on the ground within 5 to 8 hours after the first smoke was seen; instead, it actually took from one to five days. If help was needed after the fire was reached, the Forest Guard or Ranger would have, without trails or telephone lines, a trip of from 30 to 60 miles on foot to get it. This would consume from 1 to 3 days. If necessary to return with a bunch of men, imagine crawling through the brush with packs on your backs to get to a fire, or else cutting out miles of windfall and brush.

Think of the time consumed! Fire has the peculiar faculty of showing no disposition to wait. Perhaps on account of this delay a fire which in the first place covered only a few acres has in the absence of any restraining influence covered one or two thousand acres, or perhaps fifty thousand acres. Don't think this improbable; visit some of the great areas of charred stumps and snags, where once stood timber worth on the stump from \$2.00 to \$4.50 per thousand board feet. These were some of the difficulties encountered in the dry season of 1910

THREE THOUSAND FIRES PUT OUT

By the middle of August, over three thousand small fires had been put out by the patrolmen and over ninety large fires brought under control by organized crews of from twenty-five to one hundred and fifty men. Fires once brought under control were repeatedly fanned into new life by high winds, and

racing up into the crowns of the trees, jumped across the trenches which restrained them.

The weary fighters had to drop back and throw up a second or third or even fourth line of defense. New fires were starting every day, and the dense smoke made it extremely difficult to locate them, except when close to roads or railroad rights of way. With the force of men in the field, however, assisted efficiently by ten companies of Federal troops, and the organized pack-train system of transportation, most of the fires were well in hand on Saturday, August 20.

WHEN THE HURRICANE CAME

On the afternoon of that day a hurricane, strong enough in many localities to uproot whole hillsides of timber and force men out of their saddles, swept over the Forests adjoining the Montana-Idaho state line. The gale continued for fully twenty-four hours and fanned every smouldering fire in its path into uncontrollable fury. They flamed up into the crowns of the trees and spread through the adjoining timber, much of which was uprooted before the fires reached it, with incredible rapidity.

The roar of these fires was heard for miles and was likened by some of the Rangers in their path to the noise of a thousand freight trains crossing simultaneously as many steel trestles. At many points these fires jumped rivers a quarter or half a mile wide, and in several instances leaped across canyons a mile or more in width, from ridge to ridge, leaving solid strips of green timber untouched.

Cinders, ashes, and burning embers were carried many miles. The nearest fire to Missoula, Montana, was about 12 miles, yet cinders as large as robins' eggs fell in the streets, and the clouds of smoke and ashes were so thick that the electric lights were lit at 3 o'clock in the afternoon. The sun shining through these clouds gave a vivid, lurid glare as of a great conflagration. For many days it shone only as a great round blood-red disk.

WHERE THE MEN WERE KILLED

It was the top fires of August 20 and 21, driven by cyclonic winds, which wrought the destruction of life and property in Idaho and Montana this summer. Within forty-eight hours a strip of country along the Bitterroot Mountains, at least one hundred and twenty miles in length, extending from the Clark's Fork River to the head of the Selway Fork of the Clearwater, and from twenty to thirty-five miles in width, was more or less completely burned over. Seventy-four employees of the Forest Service, all temporary laborers, were killed, and as many more injured.

The rescue of the injured and missing men and of the settlers and prospectors and others endangered in the mountains necessarily took precedence over fire fighting for several days, but by August twenty-fourth the combat with the fires was resumed at nearly all points and continued until the early September rains largely eliminated further danger.

Of all the causes of forest fires, lightning alone is not controllable. It is, however, possible by an adequate system of patrol, communication, and transportation, to discover and get to all fires soon enough to put them out. Since lightning is one of the most prolific causes of the more remote fires, the importance of catching them when they are small cannot be too strongly emphasized. But the inadequate trail systems on the Forests, owing to the size of the country and the insufficiency of funds to build any but those of the most urgent character, made it impossible to get to a great many of these fires until under the stimulus of the winds and dry weather they had become too large to be handled by a few men.

It is exactly analogous to the position a city fire department would be in if the streets were kept continually blocked and each time a call was made work would have to be done to clear the streets before the engines could reach the fire. Is it necessary to emphasize the importance of sending in the alarm quickly and getting after the fire before

it gains headway? If the Forests are to be protected from fire, trails must be put through them.

THE SECRET OF FULL CONTROL

Summarizing the essential things to do to make the location and control of fires in the National Forests possible:

(1) A comprehensive system of ridge and stream trails which extend over the entire Forest. These trails average in cost from \$60.00 to \$100.00 per mile, with an 18-inch tread and 8-foot clearing. Each Forest should eventually have from 200 to 400 miles of trail.

(2) A system of well-selected look-out points and ridge trails, so coordinated as to give primary control of all districts for locating fires.

(3) A coordinated system of telephone lines extending up the main streams and tapping by tributary lines the look-out points.

(4) The purchase and maintenance of pack horses fully equipped with pack saddles. These horses can be used for building trails and, when the emergency arises, put on duty packing fire supplies.

(5) The location of caches of tools throughout the Forest at strategic points. These tools should consist of mattocks or grub-hoes, saws, axes, and shovels, enough to equip 10 men from each cache.

(6) A patrol on heavily timbered areas of at least 1 man to 30,000 acres, and in the more open regions of 1 man to 50,000 or 60,000 acres.

TRENCHING AND BACK-FIRING

So much for general control. Now as to the methods of fighting the fires when reached.

Fires are of two classes—ground fires and top fires. The ground fires are always the first to start, and the top fires occur only under high winds. Fire runs up hill rapidly under high winds. Trenches from 2 to 4 feet wide are dug down to mineral soil and all the inflammable brush and debris possible thrown away from the fire in order to give the men an opportunity to make a stand. If

the fire is creeping very slowly it can usually be stopped upon reaching this line. If fanned by a breeze, it is necessary, if the wind is in the right direction, to start fire all along the trench and back-fire.

The trenches are located along the ridges or follow the contour of the hills. Advantage is taken of streams and other natural fire breaks, such as rock-slides, to help out in making the trenches. In many cases back-firing is done at night, even against the wind, by clearing out the timber to a width of 20 feet along the trench. The clearing of the timber is to prevent a flare-up and jump across the line.

FIRE-FIGHTING CREWS

Individual fire-fighting crews include from 12 to 20 men. These men are equipped with mattocks, axes, and shovels. The proportion of each kind of tool varies in accordance with the character of country. In open yellow pine, shovels are mainly used. In dense cedar, hemlock, and white pine, mattocks and axes are most useful. Each crew is equipped with 2-man cross-cut saws to cut out large fallen timber. With a 20-man crew in dense timber the distribution is about 10 mattocks, 5 shovels, and 5 axes. Enough shovels, however, must be provided to supply each man, since the shovel is the most effective tool after the trenching has been done, and patrol on the trench to hold the fire from crossing is the important work.

Depending on the country, a crew of 20 men can cut from $\frac{3}{4}$ to $1\frac{1}{2}$ miles of trench in a day. It is clear from this why so many men are required on the fire line. A large number for a short period is essential in order that the fire line can be put in as quickly as possible.

In placing the fire trench many experienced fire fighters differ; some fight up close to the line, not giving any more than they can help; others get ahead of the fire line and trench and back-fire to stop it. The method of fighting close is most applicable when the fire is creeping slowly down a hill. On ac-

count of the fires' quieting down at night, the close fighting can usually best be done at that time. In all of the methods the object is to get the ground fire surrounded on all sides by a trench dug to mineral soil and all inflammable debris removed so that it cannot cross the line.

Fighting ground fires is hard, mean work. Digging through the forest litter and usually rocky soil in the heat of an August day, with the smoke and ashes smarting the eyes and irritating the throat, is no child's play. There is no danger until high winds change the ground fires to top fires. The violence of a top or crown fire depends upon the one factor upon which the failure or success in holding a fire depends—the wind. There is no known way to fight a fire of this character when the wind is very high, except to back-fire from a considerable distance, where advantage can be taken of natural barriers, such as roads or bare ridge tops.

FULL CONTROL POSSIBLE

The question will be raised as to whether it is possible to protect these areas from fires and whether or not it is worth while. Appreciating even the full significance of the catastrophe of this year, there is not the slightest doubt but that with an adequate trail, look-out, and telephone system, and a sufficient equipment of tools, the fires can be controlled. The fundamental factors in the whole situation are telephone communication, trail transportation, and man patrol.

Now, granting the practicability of locating and controlling fires, the question, "Is it worth while?" has been raised many times. The estimate of valuable timber in the present district of periodical fires in the National Forests of Northern Idaho and Northwestern Montana is approximately 80 billion feet. Conservatively valued at \$2.50 per thousand feet, this represents a total money value of some \$200,000,000. The recent fires covered two watersheds where sales had actually been made aggregating in stumpage value \$850,000.

This timber has all been killed by fire, resulting in an actual reduction in stumpage value of at least a half, which represents a loss of \$425,000 to the nation. Probably not over 50 per cent of this timber can be sold in its present condition, which increases this loss to over \$600,000. These sales aggregated 200,000,000 feet, and for every one thousand feet lost, there is lost \$10.00 in wages to the community. Realize, please, that this represents but two

small watersheds not aggregating over 15,000 acres. These two areas are selected because they represent not estimates but actual purchase prices obtained under competitive bids.

The immediate work which now faces the Service in this district is the disposition of the dead timber while still merchantable. The mapping, estimating, and appraisal of the burned areas is being aggressively pushed in order to prepare for sales as soon as possible.

THE FIRE FIGHTERS

By Arthur Chapman

"Where's Smith and Hennessy, Edwards, Stowe—
Where's Casey and Link and Small?"

The ranger listened, and murmured low:

"They're missing, Chief, that's all.

"Where the smoke rolls high, I saw them ride—

They waved good-bye to me;

Good God! they might as well have tried

To put back the rolling sea.

"I rode for aid till my horse fell dead,

Then waded the mountain stream;

The pools I swam were red, blood red,

And covered with choking steam.

"There was never a comrade to shout 'Hello,'

Though I flung back many a call;

The brave boys knew what it meant to go—

They're missing, Chief—that's all."

—*Denver Republican*





ANOTHER EXAMPLE OF BURNED AND WINDTHROWN TIMBER

WHAT PROTECTIVE CO-OPERATION DID

By E. T. ALLEN

Forester of the Northwestern Forestry and Conservation Association

(The success with which the affiliated private fire protective associations of the Pacific Northwest met the difficult situation thrust upon them by the menacing fires throughout the region makes a remarkable showing. Scarcely less noteworthy is the fact that this success was due, first, to the example of the Forest Service, whose methods are closely followed by the associations, and second, to a liberal policy of spending money in order to get results. The private co-operators spend from one to ten times as much on fire protection alone as the Government spends for the entire administration of the national forests.—Ed.)

PRINCIPLES OF PROTECTION

The Pacific Northwest suffers from fire exactly in the measure that as a whole or locally it ignores the two basic essentials of prevention—respect for fire laws and preparedness for emergency.

Excepting the comparatively few caused by lightning, every forest fire results from malice or avoidable carelessness. Either is criminal, prohibited by laws entitled to the respect and enforcement accorded laws against theft or murder. With means of securing such respect and enforcement, we should have little fire trouble.

Every fire, however caused, is small enough at first to be easily put out. With an adequate force of trained, vigilant men, furnished proper transportation, means of communication, and equipment, fires in the forest do not become forest fires. Patrol is essential, and is effectual in the measure of its organization and facilities.

These proven axioms are recognized by the Forest Service, which proceeds accordingly, as far as wholly inadequate funds permit, in protecting the national forests.

Outside the national forests these axioms are not recognized, or at least not applied; by state or public to a degree even approaching that necessary to protect lives, property, and public welfare generally. This lack of defensive preparation results in tremendous injury to

the community every year, and in abnormal years, of which 1910 is only one example, invites irretrievable disaster.

PRIVATE ASSOCIATIONS

While the interest of private owners in forest protection is no more direct or great than that of the community, it is more promptly realized. In the Pacific Northwest, especially in Idaho, Washington, and Oregon, private owners of forest land have consequently gone even farther than the Government, and very much farther than the states or the public, in the installation of protective systems. Their methods are practically identical with those of the Forest Service, making patrol the main point, supplemented by fire fighting, trail and telephone building, etc. The expense is largely borne by co-operation, pro rated on the basis of acreage owned, although many owners do much independent work also.

There are about ten of these co-operative associations, among the largest being the Cœur d'Alene, Clearwater, Pend Oreille, and Potlatch Timber Protective Associations in Idaho; the Washington Forest Fire Association, and the Oregon Forest Fire Association. They affiliate for many central purposes in the Western Forestry and Conservation Association, which is a grand lodge for all such organizations and for conservation associations in the five states from Montana to California.

In Idaho the state itself is a member of all associations, paying its full share per acre for state lands embraced. Washington does not share the expense of patrol, but helps defray the expense of additional day labor for actual fire fighting.

This work by the private owners gives the very highest efficiency in patrol and fire fighting. They are not limited by statute or appropriation bills in providing adequate funds and using them to meet emergencies. Being interested only in the best results, and technically familiar with conditions, they get good men and practical supervision. They spend from one to ten cents an acre for exclusive fire work during the fire season, while the Forest Service has to spread a cent or two over all sorts of administrative work for the whole year.

The private owner, however, is practically helpless in enforcing the punitive laws which are very generally regarded with contempt, because there is little state machinery for enforcing them, and here lies one of the greatest dangers to property and life outside the national forests.

WHAT THE CONDITIONS WERE

To come now to the specific conditions of the season of 1910:

When it became apparent that unusual drought was bringing a grave situation, the private patrols were gradually increased and every effort was made to reduce the hazard. The Western Forestry and Conservation Association had repeated warnings published in every newspaper in the Northwest. Letters were sent to loggers and others, urging every precaution in the woods. Circulars, posters, and other publicity matter were circulated widely. All this had undoubted great effect, but did not, of course, remove the general carelessness with fire that prevails where the fire laws are not respected.

Although June and July continued hot and dry after an unusually dry spring, and the danger during these two months had been equal to that of the ordinary entire season, the associa-

tions extinguished hundreds upon hundreds of fires in their incipency and practically prevented any loss within their territory of millions of acres. But finally, in August, there prevailed throughout the Northwest strong winds which, with the forests already like tinder, fanned every fire that could not be reached at once into a serious conflagration.

An army of private patrolmen was by this time in the field, exerting every effort. The four Idaho associations had from 30 to 50 regular men each, the Washington association 125. Besides these, additional and independent patrols comprised several hundred more. Fire fighters were freely employed to check and hold fires that became serious.

But as conditions became worse, the systems broke at a few of their weakest places, and almost always for one of two reasons—persistent violation of the fire laws or juxtaposition of unprotected lands. It was an utter impossibility, especially after the force was taxed to the utmost where life and property was particularly in danger, to meet all the new fires that bust out as a result of public indifference.

THE RESULTS ACCOMPLISHED

Nevertheless, effort was never once remitted, and the associations, like the Forest Service, massed all the men they could hire wherever they were most needed, without regard for fine distinctions of ownership. Menacing fires were fought, although on the lands of men who had refused to protect them. The same credit is due very many owners who worked independently. In western Washington \$200,000 was spent during the season for private fire work. The Cœur d'Alene association alone spent about \$50,000 in Idaho, having as high as 850 men in the field, and its neighbors in proportion. The Washington association had 1,200 extra men. Oregon owners were less perfectly organized, so exact figures are not yet available, but doubtless spent \$100,000.



Fire at St. Joe, Idaho, from a Distance of Four Miles

It is impossible to give any reliable estimate of the total loss at present, particularly in Idaho, for reports are constantly being changed by more careful investigation. First estimates seldom include possibilities of salvage where timber is not destroyed. Two important facts may, however, be stated with conviction: First, that the losses were few and insignificant when the area involved is considered; and, second, that had it not been for the timber owners' effort the contrary would have been true and the Pacific Northwest would have suffered a calamity past conceiv-

ing of. The really bad fires can be counted on the fingers, while those extinguished, which under the conditions that prevailed would otherwise have been as bad or worse, number by thousands.

It is sometimes believed that the lumberman is the enemy of forest preservation and should be compelled to greater duty to the public. Whether or not this is true elsewhere, in the Pacific Northwest he is doing more for the cause than any one else, and the problem, if the cause is to succeed, is to get the public to perform its own duty.



FOREST FIRES IN WASHINGTON AND OREGON

By C. S. CHAPMAN

District Forester, District 5, U. S. Forest Service

THE summer of 1910 was conspicuous by lack of rainfall. Early in the spring the snow left the mountains of eastern Oregon and Washington, where it usually lies until much later, and those who could read the signs predicted a dry summer. From the middle of June until the middle of September, a period of nearly ninety days, there was practically no rain. The result of this drought was that in early August the woods were as dry as they usually are in late September, with no immediate prospects of rain.

East of the mountains the grass was dry and parched, and a match or cigarette stub thrown into it easily started a serious fire. On the west side slashings became tinder-like and a spark from a donkey or locomotive was all that was needed to start a fire which in an hour would require twenty men to extinguish. The dense forest of the West Slope does not ordinarily burn easily. The dense shade protecting the underbrush from the direct rays of the sun causes it to stay green and so serve, in no small measure, to prevent the starting of fires in the ordinary way. But a fire starting in a dry slashing, with an enormous amount of fuel in tops, limbs, and defective and broken trees strewn over the ground to feed upon, will sweep into a stand of green timber, kill and dry out the dense green underbrush beneath the stand, and thus make more fuel for fires which often go into the tops and are then beyond control. The greatest menace to standing timber on the West Coast is the old slashings. Second to this is the campers and hunters,

who not infrequently build fires against defective logs and then fail to put them out. Such fires can gather sufficient energy to dry out the green underbrush and start dangerous conflagrations.

The patrols of the Forest Service and private owners kept the fires well in hand until the middle of July. On the Oregon National Forest a fire started in the Santian country on July 19. This was the first of the bad fires, for although it destroyed little government timber and was soon under control, it caused loss of life. Three men in the employ of the Hoover Lumber Company in trying to recover their tools which were in the path of the fire were overtaken by it and killed. Later the Hoover Mill burned and set fire to surrounding timber. During the latter part of June and during July the forests were getting in serious condition and both the government and private timber owners were taking extra precautions to prevent the possibility of disastrous fires, starting. In spite of this, however, Supervisor Reid of the Colville National Forest early in July reported fires on his forests. By July 29 he reported thirteen fires burning and more starting every day. All available help was secured and the National Forest officers were tireless in their endeavor to handle the situation. Fires threatened on the north across the Canadian border and on the south from the Colville Indian Reservation. On August 11 the Forester was wired for troops as the situation was growing more serious and not enough experienced men could be had to handle the crews of green men, the only men available, brought in to fight the fire. Two



Forest Ranger R. M. Debitt and Crew, near Avery, Idaho

companies of troops left American Lake, August 13, for the Colville. Before their arrival, however, the rains set in and they were only required to assist in patrolling the fire lines to be absolutely sure that no fires started up again. In all, twenty-nine fires started on the Colville Forest this summer, burning over an area of approximately 100,000 acres of merchantile timber and causing a loss of 50,000,000 feet of timber valued at not less than \$150,000.

Before the fires on the Colville Forest were fairly under control, the situation on the Crater in southern Oregon became serious and those on the Wallowa and Whitman forests assumed serious proportions. But the condition on the Crater was by far the most serious in the two States, for not only did the fires burn in heavy stands of valuable timber, but the lives and property of settlers were seriously threatened, and even a city was menaced. As on the Colville, fires on the Crater were scattered over the entire area and National Forest timber was

threatened by fires burning on private lands outside the boundaries of the Forest. The surrounding country was drawn on to the fullest extent for help, but enough could not be secured. On August 19, 110 soldiers arrived at Medford, and on August 21, 250 more. These men greatly strengthened the force. Through the willingness of the men and the hearty cooperation of their officers they became at once an efficient fire fighting crew, which stayed with the situation until the fires were under control, September 9.

It was estimated roughly, for the timber has not yet been carefully cruised, that on the Crater alone timber to the amount of 140,000,000 feet, valued at \$150,000 was burned, while, if the value of young growth killed is counted, the loss aggregated not less than \$450,000. In all, over 110,000 acres were burned over. The loss on private lands adjoining the Forest was also great. It is not possible to say what this was, but it is certain that it also can be counted in hundreds of thousands. On the Crater alone over



Seventy-two Horses Were Packed Here for the Fire Camps

seventy-five small fires were extinguished by the rangers before they gathered headway. At one period of the fire danger Ashland, a city of 4,000 inhabitants, closed all of its business houses and the men assembled on the fire line to save the city. It is appalling to think what the situation might have been, and the great work done with an insufficient force, emphasizes how much more effective the protection might be made.

The conditions on the Wallowa, Whitman, Wenaha, Cascade and Umpqua were serious. In each of these forests valuable resources were destroyed and, but for the prompt action on the part of Forest officers, not only timber but other property valued at many hundreds of thousands of dollars would have been lost.

This is the most disastrous fire season the Northwest has ever known. It is estimated that in the two States of Oregon and Washington, one billion feet of National Forest timber has been killed by fire. Most of this, because of inaccessibility, will never be marketed.

It is probably true, that the fires in the early 60's, which destroyed an enormous belt of timber along the Oregon Coast, were more destructive than those of this year. But in those days, while the timber was in reality valuable, it meant little to the citizens of that State. The loss would have been placed at a low figure as compared with that of this year. In 1902, Washington and Oregon suffered severely from forest fires, but they were relatively local. This year's fires have been general. No section has escaped and the total loss, if it is ever accurately ascertained, for both the government and private lands, will be staggering. Fires in Washington and Oregon have cost the Forest Service, for extra labor alone, \$150,000, besides the patrols regularly maintained. In addition to this, private owners in both States have expended large sums both for fire fighting and in patrols.

The moral to be drawn is plain. We must always be ready for the unusual year. The losses of a year like the present would pay for protection for many years. Absolute safety must be

aimed at. It is better to spend money in preventing fires from getting under headway than in fighting large fires. During the dangerous season no fire guard should have a district to patrol which he can not cover easily in one day. The average area covered by each National Forest ranger in Washington and Oregon exceeds 50,000 acres. Not infrequently it is more than this.

In many instances the value of standing timber guarded by a single ranger exceeds \$3,000,000, and when it is considered that these same men are also responsible for the prompt and efficient conduct of other National Forest business, the inadequacy of such a force needs no further demonstration. It is sufficient to say that good insurance on three million dollars' worth of property could hardly be had for \$1,100 or \$1,200, the salary of a ranger.

The National Forests of Washington and Oregon contain over one-third of all the standing timber in such Forests throughout the United States. Its value, conservatively estimated, is not less than \$400,000,000. To properly guard this great national wealth requires adequate means of communication, trails, roads and telephone lines, and a sufficient number of men during the summer months to patrol the area properly. Trail and road building is here more expensive than in any other section of the United States, but the value of the timber warrants large expenditures, for it is the finest timber in the world. Provision for its proper protection should be made at once. The people of the United States can not afford to wait until disaster forces the necessity for such protection upon them. Here is a case where the door may be locked before the horse is stolen.



HOW TELEPHONES SAVED LIVES

By C. J. BUCK

Assistant District Forester, U. S. Forest Service, Portland

(From the Pittsfield (Mass.) Journal of October 5.)

(The following account of the fight against the destructive fires in southern Oregon demonstrates by experimental proof what the value of prompt communication is in emergencies such as are likely to arise at any time during the danger season in the rugged country of the West. Mr. Buck, who tells the story, is at present assigned as chief of the Office of Lands in his district, but assumed charge of the fire-fighting force, as described, when the need of good generalship became great.—Ed.)

HOW telephones saved settlers from death in forest fires," is the attractive title of a story told by Assistant District Forester C. J. Buck in the *Oregon Sunday Journal* of September 25, when he returned from successful generalship of the southern Oregon fire situation.

The timber loss in southern Oregon was 800,000,000 feet on Government and private holdings, yet not a life was lost. It was the worst fire in northwest history, but telephones carrying warnings with electric speed warned the settlers and the hunters and the campers so that they got safely each time from the path of the devouring destruction.

There were fires that raced faster than a man could run and burned with such tremendous ferocity that green forests were completely burned. Where great trees had towered to magnificent heights, only smoking stumps were left. The breath of the flame in the canyon like a furnace heated seven times laughed derisively at the puny efforts of puny men to stay its course and reached out a menace of death, to enfold them.

Here and there were the isolated homes of lonely settlers; out in the woods were hunters; along the streams were fishermen. Over the country hung the smoke pall. The great area with its clustering towns and its scat-

tered people had never known such a drought. It was as dry as the sands of Sahara where rains never fall. The sun had been shining down day after day its heat unbearable and the forests were like tinder, ready to blaze from a spark. The hot winds raged, too, day after day, ready to fan the spark into a roaring torrent of madly spreading fire.

This was the condition found by Forester Buck when he stepped off the train at Medford, going from Portland to respond to urgent calls for assistance. The people were almost scared to death. The country was so dry, the winds so high and so unceasing, and the smoke cloud so dense that no one knew just when the flame would reach out hungrily in his direction.

FIRES ALL AROUND

"Fires were burning at Mount Pitts, Anderson Creek, Wagner Creek near Ashland, near Butte Falls, on Clover Creek, Elk Creek, and at Cat Creek," said Mr. Buck. "There had been no preparation for so many fires. They were all unexpected. There were not by any manner of means enough of a fire-fighting force on the ground to handle the blazes, even had they been of the ordinary controllable sort. Confusion was added to apprehension by



Company G, 25th Regiment from Fort George Wright, Washington

reports constantly being received of new fires. I'm going to say frankly, now that the danger is over, that for a time we thought the whole country would go.

"To get an organization under such conditions was as imperative as it seemed impossible. Never at the best of the time could we get enough men to fight the fires and get the kind of a continued patrol we needed.

"Right here is where the telephones saved the day. In the Crater National forest the government has spent \$3,500 in constructing 60 miles of telephone lines between the various outposts of the patrol rangers. We also had free use of such private telephones as there were. The fire situation was constantly changing. When a few hours before it might have been clear, a carelessly dropped cigar might have been fanned into a raging fire. At a point a little distant, where the fire had been serious, control of the situation might have been obtained. So by a constant system of telephone reports we were enabled to know where the

need for fire fighters was greatest and to keep them moving accordingly.

"The fire at Deadwood, a small but serious blaze, will serve as an instance. Dead Indian, a few miles to the north, had been pretty well burned over, when in the middle of the night, news of the fire at Deadwood came. I found it possible to move men from Dead Indian and from Ashland at the same time by using the telephone. In 24 hours the situation was under control. Had messengers been trusted to bring the news, and other messengers been necessary to gather up the men and send them to the fire front, the blaze might have spread beyond all control. At Deadwood the settlers came near losing their property. Fire burned clear up to the back yards and the fire-fighting that was done, before the blaze could be controlled; was of the heroic kind.

THE WORST FIRE

"The worst of all the fires was on the South Fork of Rogue river. A for-

est officer told me that at a distance of a mile the roar of the flames sounded like an express train crossing a trestle near at hand. I do not believe another fire in this district destroyed so much timber. The total loss was not less than 350,000,000 feet, worth on the stump about a million dollars. Here the flames, racing through the tree tops when the wind blew at all, spreading along the ground when the air was calm, burned down the green timber, absolutely destroying its merchantable value.

"The pick of Jackson county timber, to be brief, was destroyed. Much of it was in private ownership.

"Two companies of soldiers were sent to help the local fire fighters. They spent a good deal of their time protecting the settlers' houses, but they did splendid work. Unorganized work on the Rogue river fire would have done little good. The thing that puzzled them most was the way the fires spread. They arrived first at the northwest corner of the burning area then began the work toward the east, trenching and back-firing.

"Occasionally they sent ahead to learn how the fire was spreading. In the morning it was about a mile ahead of them. This gave confidence. They thought by night they would surely have caught up. Night came, and imagine the chagrin of the fighters when they found that the blaze was five miles ahead of them. It was burning around them and coming back toward them. It was then found necessary to immediately move camp a distance of 12 miles before they could get at the fire front. But there is no doubt that the soldiers saved in this locality 300,000,000 feet of timber. They certainly earned their transportation and their wages many times over.

"As much could be said for all the soldiers sent to fight fire in the Crater forest. They worked as hard as men could work, unmindful of the danger or the exposure. Some of them pleaded that they might be allowed to work extra hours in order that there might be a greater certainty of bringing the flames under control.

PRAISE FOR THE SOLDIERS

"Particular credit is due their commander, Major Martin, for the masterly way in which he handled his men. He inaugurated a system of keeping in close touch with all points of danger that was well nigh perfect. He cooperated closely with the Forest Service. He kept in constant communication with me, so that he might know where to send his men to work the most effectively. It would take a long time to tell how they worked eagerly and uncomplainingly, with perfect system and discipline and with organization impossible to the volunteer fire fighters or to the laborers that we hastily employed.

"To say that no lives were lost does not imply that there was no danger. Ashland was in serious danger. It was a wild and dramatic time when the fire bells rang and the people assembled on the public square. No wonder the faces of the men grew pale as they heard Ranger Gribble tell them that if the wind kept blowing, their homes and the city might go.

"Ashland, understand, is a fine little city of between eight and ten thousand population. But from the edge of the town to dense timber is not more than a mile and a half. There is a great area on other sides of the town that is overgrown with brush tremendously inflammable in such a season as this. The business men closed their stores and went out to fight fire in the forest. They did good work, for they were fighting for their families and their property. A foggy day came, when in other places it rained, and the fires subsided. Fear was relieved, the tension relaxed. Then the wind came again, and again the town was in danger. So the people fought their battles against the fire fiend all over, and they won.

"In the office there was press of business and dramatic scenes. It was like headquarters in war time. I talked on the telephone on an average of six hours a day. When I got away from that job I had scarcely any voice left.

"Telegrams poured in from every part of the United States. They were inquiries from people who had friends out in the forests. These had to be answered. A local paper printed a story about settlers being endangered. A man stumbled into the office, his face blanched. He could not speak. In his hand he held a copy of that paper. 'My family is there,' he finally gasped. It took a lot of work to reassure that man and send him on his way again.

"Up at Mosquito Ranger's Post, Mrs. Holts, the ranger's wife with her children were hemmed in by the flames. For a while we thought them burned. But finally they got out alive. But it would be hard to picture the grief and the worry that attended all these things.

"There were so many reports of lives endangered, lives lost, settlers, fire-fighters and hunters hemmed in by the flames, that we never knew what to believe. It was such a time as a man never forgets.

THE FIRES' LESSON

"Now that the danger is past, we who fought the fires are left with certain conclusions concerning the way in which the situation must be handled another time.

"There must, in the first place, be better fire protection. More rangers are needed. This not alone for the southern Oregon country. No one can tell where the fire will be worst next year.

"Crater national forest has an area of over 1,000,000 acres. At the time the fires broke out there were between 25 and 30 rangers for the whole vast area. There should at least be a

ranger for each township of 36 sections. There should be more complete provisions for the reporting of fires. The telephone service, such as we had, undoubtedly was the agent of preservation from double the destruction recorded. But there should be at least 250 miles more of telephone lines. This costs \$60 a mile—cheap compared to the value of the service.

"The most essential thing in forest fire fighting is getting men on the ground. Ten men to handle the blaze in its incipency are worth more than 200 after the flames gain headway.

"And, of course, the great thing in preventing destruction of forests by fires is precaution. Campers and hunters set most of the blazes. There seem to be indications in southern Oregon that some of the forest fires were purposely set. Some of them originated in slashings. But the people tell me that when they have learned of a hunter or a camper moving from their vicinity they go to look at the site of his camp, and, ten chances to one, they will find embers, which if caught up by the wind constitute the beginning of an uncontrollable fire."

Assistant District Forester Buck is accredited by the people on the ground who watched his work and by others who know of the menace of the fires with having given an almost superhuman service in preventing greater destruction. It was a time when a man needed to keep his head cool and his mind working rapidly. Order needed to be worked out of confusion. This the assistant district forester did. Had it not been for his work undoubtedly the timber loss, great as it is, would have been doubled.



FOREST FIRES IN WASHINGTON

By JOEL SHOMAKER

Chairman, Washington Conservation Commission

The State of Washington has passed through another ordeal of forest fires. Thousands of acres of standing timber have been burned over and the country left in ashy desolation. Large areas of young forest growth have been wasted, and soil fertility consumed, by the unnatural burning process. The loss to life and personal property has not been so great as in adjacent States, but the total waste resulting from fires will reach almost the highest point in the records of State history.

My own experience will give an illustration of what has taken place in other sections. On July 3 a fire was noticed in an isolated spot on my Nature Nursery. It had been started in the débris left from loggers, several hours before I discovered the smoke, as I live on the waterfront of Hood Canal and the fire was set far back on the upland. It had made such a start, when fighters arrived, that nothing could be done but watch the marching path of destruction.

That fire continued its trail of annihilation for about two months. I worked day and night to save my own property, and many others labored to prevent conflagrations in both private and public property. I place the loss to my nursery, in timber, young forest growth, plants and shrubs, waste in soil fertility and destruction of scenery, at \$10,000. It burned over nearly 200 acres of my land and extended far out into the neighboring country.

The season was favorable for fires, as it is said to have been the driest summer in twenty years. I patrolled the borders of the fire approaching my dwelling, and, with shovel in hand, checked the flames for a time. But nothing but water did any good. When

the family had been aroused to take the boat, and trees were falling all around the house, we put a stop to the flames by using water, carried by hand from the bay, and cutting trenches to prevent burning leaves from crossing.

Other fires in my vicinity did much damage to the forest and soil and threatened homes and settled communities. In some districts the fires extended into towns and the danger became so great that Governor M. E. Hay issued a proclamation calling on all loggers to cease operations for twenty days and set their employes to work in trying to put out the flames. Appeals were made to the War Department for assistance in bringing rain, by firing guns, at different ports on the shores of Puget Sound.

It was feared that a repetition of the "Black Friday" of 1902 would be witnessed, and the President of the United States was asked to help in bringing rain. Troops were called out from the annual encampment and sent to different sections of the Northwest to aid the forest rangers in saving timber and valuable properties. Smoke covered the land and waters, and navigation was impeded in the same manner as during the raging fires of 1902. August was a critical month, and but for showers at the close of the month would have been a time of wonderful waste and destruction of timber, watersheds, and native resources.

What caused the forest fires? That question is always uppermost after the country has been laid waste. As I see it, forest fires are synonymous with ignorant and malicious mischief. It was the custom of Indians and some pioneers of Puget Sound to set fire to dead brush in order to clear deer trails, burn

over patches for wild blackberries, or open places where grass could be grown for pastures. In some instances, it is asserted, parties took the fire plan for getting even with land owners and others. Again, it is stated that men set fire to timber in order to obtain work, at 30 cents an hour, fighting the fires.

The wasteful methods of logging may be held responsible for the origin of many fires. Loggers take out marketable timber in the easiest and cheapest way possible. They fell trees in all directions and leave the limbs and branches where they fall. They knock down enormous quantities of young timber and thereby leave slashings for fire, whether it comes as an accident or for other purposes. No efforts are put forth by the average loggers to guard the property of the land owner or the surrounding citizens. They simply skim off the cream and kick over the bucket to prevent others from securing benefits from the remnants.

Clearing land by burning slashings is one prolific source of fires. That method appears to me to be an obsolete, dangerous, and slovenly way to clear logged-off land. I would not slash and burn any portion of my land, nor permit others to do so. It destroys the soil fertility that every farmer needs and must replace at much expense. There is no time gained by resorting to such methods. The slashing burner endangers his own property and that of his neighbors unnecessarily. The only way to properly clear land is to cut the brush and logs, pile in the right condition, and burn under safe restrictions. Our forefathers cleared land that way, and they lived and prospered and did not menace others.

Many valuable lessons may be gleaned from the forest fires of 1910. One of the first is the wise, efficient, and capable system of the United States Forest Service, exemplified in the national forests. The plan adopted by that branch of our government for protecting the forests and conserving their resources for use now and in the future, is most commendable. And the men engaged in that department are entitled to all the praise the people of Washington can be-

stow for their heroic efforts in behalf of the government and the people comprising the nation. They make it possible for mature timber to be removed without damage to the growing forest, and encourage the spirit of national conservation.

A system of patrol for national, state and private forests, similar to that introduced on the reserves, should be adopted everywhere that trees are grown for use, now or hereafter. It is too late to lock the stable door after the horse is stolen. And it is generally too late to stop a forest fire after it is once under good headway. The remedy lies in preventing the blaze in its incipiency. Some men will set forest fires, in unguarded places, so long as the world stands. Some men will get drunk so long as liquors are manufactured, regardless of the wants of their families. We need laws that will curtail the destructive forces in depraved manhood, in the forest and saloon.

In Japan the man who plants a tree for posterity is considered a philanthropist, while in the United States the man who destroys the native forest, in quest of present money, and is successful, is held up as a capitalist. It is just as sensible for the orchardist to cut down his trees to harvest the fruit as for the logger to waste the young forest in removing the marketable timber. The Forest Service is trying to remedy this evil. It should be upheld by every loyal American citizen, and its plans should be adopted everywhere that timber is a commodity.

The Washington Forest Fire Association is an important factor in saving the timber of this State. It works in harmony with the warden system, provided for by the state legislature. They cooperate with the timberland owners, and assist materially in preventing fires and stopping the course of those which get from under control of private parties. But both organized forces need more assistance from the state and nation. They cannot perform impossibilities. A fire warden cannot be in many places at the same time. Their powers

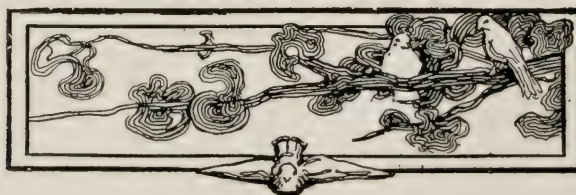


Big Creek Fire, Where Thirty Lives Were Lost

should be enlarged and their duties extended to cover broader educational fields of labor.

Conservation of natural and national resources is a national question of more importance than any issue before the American people. It forms the foundation of present and future agricultural and commercial prosperity. If handled correctly it will make of the State of Washington one of the greatest commercial divisions in the world. If neglected, or corrupted through political manipulation, it will result disastrously to the entire people. It is a question in which the homeseekers and investors of the entire nation should have a common interest.

The forests should be held sacred for use, now and in coming years, and not wasted or destroyed by any forces, either private or national. They contain the sources of power for developing the country, and that should not pass from the control of the whole people. They hold the reservoirs for supplying water for irrigation and domestic purposes, in the valleys of industry, and should be guarded by all the people, for the benefit of all the people, and not for the enriching of corporate interests in furnishing the necessities of the people, in order to make money from monopolies in things the people must have to insure continued prosperity.



TWO MILLION DOLLARS WORTH BURNED IN ONE DAY

By GEN. C. C. ANDREWS

State Forestry Commissioner of Minnesota

(If yet another proof is needed to show the necessity of full patrol against forest fires, here it is. September 1, General Andrews tells us, the ranger service in Minnesota was discontinued for lack of funds. On that very date a Minneapolis newspaper stated editorially that the fires in Minnesota forests had already destroyed property this year whose money value would have sufficed to cover the cost of the proposed extension of the state ranger service for 50 years. And as early as July 22 press reports from Bemidji tell of the dangerously dry condition of the forests in the region devastated on October 7.—Ed.)

AT THE request of *American Forestry*, Gen. C. C. Andrews, state forestry commissioner of Minnesota, made the following statement, under date of October 13:

The disastrous forest fire in Minnesota on the 7th instant in the vicinity of the Lake of the Woods and Rainy River was driven by a tornado, and destroyed the villages of Baudette and Spooner. The loss of life probably will not exceed fifty; the number now known to have perished is twenty-nine. I am unable now to estimate the loss of property, but am convinced it will exceed \$2,000,000. The area of the fire probably did not exceed 300,000 acres.

The country swept by the fire is generally level, covered principally with Norway and jack pine, spruce, balsam, white birch, and tamarack. It is traversed by the Canadian-Northern railway and is mostly destitute of wagon roads. While quite a number of new settlers are scattered through the country, there are as yet only about six organized townships in what appears to have been in the track of the fire.

Considerable timber had been cut in the region and much brush and refuse left unburned. The whole season from April 1st has been remarkably dry. Numerous fires occurred which were fought by the settlers; some of

the fires burned into bogs and probably all of them were not wholly extinguished.

Just where and how this fire originated I am unable to say, but the latest reliable information I now have is that it came from south of the Canadian-Northern railroad.

In some cases the land of a new settler in such a region may be partly covered with refuse from logging or windfalls, which he is strongly tempted to burn in dry weather. The country is also more or less frequented by other persons who are liable to cause fire.

How shall we prevent the negligent use of fire in the forest? By our present system in organized townships the three supervisors and clerk are fire wardens; they are paid 25 cents an hour for the time they are employed; they are expressly required to take energetic precautions to prevent fires and may call help to control them, and every person called upon to help must do so unless he has a justifiable excuse. Wardens can be specially appointed for unorganized territory, but it sometimes occurs that in such territory there is not a suitable resident for the position. Fire fighters are paid 20 cents an hour for their time.

Wardens, in a dry season, may patrol their districts or employ patrols. The minimum penalty for setting fires



A Fire Victim on an Indian Travoy, Avery, Idaho

which endanger the property of another in the vicinity of forest land, is now \$50. Offenders have to be tried by local magistrates, who are often too lenient. The plan followed in this state has been to enforce the law severely, and prosecutions have been instituted whenever sufficient evidence has been found.

The employment of rangers to go through their respective districts to assist, inspect or compel the activity of fire wardens is authorized, but the appropriation for such service at present does not admit of the employment of a sufficient number of rangers nor for a sufficient period of time. For lack of money, ranger service had to be discontinued the first of September. Whether if they could have been employed

longer this recent calamity would not have occurred, no one can positively say.

I think it would be an improvement to our system of preventing forest fires if we require that in logging the branches of at least the coniferous trees be lopped and burned at the time of cutting, when logging is done between the 1st of November and the 1st of April; also that we have adequate means for the employment of competent patrol or rangers; and further, that we copy the New York law requiring railroad companies to maintain efficient patrols between April and November, and in case of their failure to do so, that the state do it, at the expense of the railroad companies.



FIRES ON THE FLATHEAD FOREST IN MONTANA

By H. H. CHAPMAN

Assistant Professor of Forestry, Yale Forest School

The fact that many of the fires in the west this summer were set by lightning is often questioned by those unfamiliar with western conditions. But there are very few rangers who have not had practical demonstration of fires from this source.

The writer was employed in the Swan Valley east of Flathead Lake during July and August, and can testify to the truth of this fact. On July 3, at 4 p. m., after several weeks of dry weather, we had a thunder storm of half an hour's duration, with a heavy down-pour of rain. A few minutes after the storm passed, the ranger called our attention to a smoke about a mile off. This was located in the heavy timber, and was found to be a dead larch tree which had been struck and was blazing from top to bottom. It could not be cut down, so was allowed to burn off and was then ditched around for its whole length. No water was available to put it out, and dirt thrown on it did not quench it. The tree burned for over two weeks, during which time it was a constant menace. The fire followed the roots for distances of 8 or 10 feet and would reach the surface outside of the trench. The place where this occurred was 75 miles from the nearest town and only its prompt discovery and constant watch by the ranger prevented it from developing into a fire that would have swept the whole valley. It had two months in which to spread before any rain came.

And the fourth day after this storm a heavy smoke was seen on a mountain spur twelve miles distant. There was no trail and we started the

following morning with pack horses through the timber and reached the fire late that afternoon. Fortunately there had been no wind that day and the fire was smouldering. It covered nearly two acres in a long strip where the wind of the day before had blown it up the shoulder of the ridge. At the lower end of the burn was a dead larch tree with a fresh lightning scar.

The location of the fire made it impossible that any person could have been there for any purpose whatever, and the position of the lightning-scarred tree coincided exactly with the probable center from which the fire had traveled to spread up and down hill. So that while no one saw this fire start from lightning as in the case of the first fire, the evidence is just as convincing. The bolt had not set this tree on fire, but had ignited the dry duff at its base. This had smouldered for three days, and had been finally fanned into life on the fourth day after the storm.

Owing to the inexperience of a fire guard employed to watch this fire, it broke out three times after it had been completely subdued and surrounded by trenches and was still burning when rains came in September. It had been confined to less than two hundred acres in area. If allowed to run it could have burned over from 20 to 100 square miles. No other fires occurred in the valley all summer except those set by lightning.

Fires of this character usually start in some remote spot that cannot be reached promptly by the ranger because there is no trail and it is absolutely nec-

essary to take horses in to carry food, bedding, and tools for fire fighting. A trail must either be cut out to a point near enough to reach the fire from camp or the horses taken slowly and painfully through country covered with tangles of down timber and dense thickets, with the risk that in case the fire got well started there might be some difficulty in getting out again. Meanwhile the fire is gaining headway, and the ranger finds on reaching it that he can make no impression on it and needs 20 to 50 men to control it. He proceeds to the nearest telephone station and the men are sent in from some town, or in rare circumstances they may be recruited from settlers nearby. Their beds, provisions and cooking outfit are packed in 20 to 75 miles on animals hired for the purpose, and after a delay of from 3 to 7 days they reach the fire.

By this time it is so large that they cannot entirely subdue it, but can only check its progress, head it off, gradually surround it, and, if rains come or the wind does not blow too hard, hold it within narrow limits. Then, sooner or later, a high wind is sure to occur, and these smoldering fires leap up and across the trenches and sweep over wide areas in a single day.

In the South Fork valley, east of Swan Valley, an area of 110 miles long had to be protected by a force of guards so small that it was impossible for them to at once reach and put out fires starting from such causes. One fire which resulted from the carelessness of a half-witted youth who was hunting in the mountains, got such a start that a crew was necessary.

This crew was sent in accompanied by fifty pack horses, but had to stop on the way to control three other fires, and the first fire before they could get to it, had burned over a township. The ranger in the Swan Valley had instructions to look up this youth and es-

cort him out of the forest, and would have done so had it not been for the fires set by lightning in the Swan Valley, which prevented him.

On the west side of the range a similar situation developed. A fire got away from the ranger through the impossibility of his reaching it in time. This fire was burning during the week preceeding the great fire in Idaho. The same wind that caused such destruction there, blew this fire across the timbered summit of the range and swept it down into the valley with a fury that made all attempts to stem it hopeless for the time. Burning brands and bark were blown across the Swan River and fires started for three miles along the further bank. By great good fortune this wind was followed by rain which enabled us to attack the fire, and by ten days' work with 20 men who were already on the ground its further progress was prevented.

This in a small way illustrates the conditions which caused the larger conflagrations in Idaho. Wherever fires were set in low ground, along railroads and trails, in inhabited districts, they were controlled promptly. But, largely through lightning, many fires were started that could not be reached. These fires, on the day of the great wind, swept down on the protected areas in solid fronts miles in extent and destroyed the work of weeks of fighting.

When the national forests are provided with complete systems of trails, when enough men are employed to reach and control fires as soon as they start, and when, by the operation of the Forest Homestead Act and the development of transportation, vast stretches of wilderness become populated as far as their resources will permit, the conditions that proceeded the great fires of 1910 will have been brought fully under control, and a repetition made impossible.



THE PROTECTION OF FORESTS FROM FIRE

By HENRY S. GRAVES

Forester, U. S. Department of Agriculture

Part III—Continued from October number

Burning Brush Piles

An excellent time for burning brush is after the first snow of winter. (Pl. IV.)* This is usually a light fall, and the snow does not penetrate the compact piles of brush sufficiently to prevent burning. There is no danger of the fire running on the ground, and the branches of the standing trees are so damp as to prevent injury by the rising flames. If the brush is burned before winter, it should be only during damp weather, when the ground is so wet that fire will not run easily.

When large areas of piled brush are to be burned the work should be organized with care. It should never be undertaken when there is a strong wind, and the best time is in calm weather. If there is any wind, the burning should begin with the piles on the lee side. Several piles may be fired at one time, but they should be some distance apart, with one or more unburnt piles between them. When the first fires have been burned down to coals, the intermediate piles may be ignited. This alternating method of burning the piles prevents the injury to trees and young growth between the piles that might result from the collective volume of heat of adjacent fires. Just as the brush on level ground is burned against the wind, so, on a hillside, the piles near the top are burned first, and the work progresses down the slope.

Whenever large areas of piled brush are to be burned, a sufficient force of

men, equipped with fire fighting implements, should always be present to insure that the fire will not get beyond control. In some instances, when brush is piled in the winter during logging and left for later burning, the piles become very wet from the snow and rain and do not dry out till late spring or summer, a time when burning on a large scale is dangerous. If the brush of winter lumbering can not be burned as the logging proceeds, the piles must ordinarily remain unburned till the first snow of the following winter, or till especially wet weather comes in late summer or fall.

The devices used in different localities for starting fires in piled brush are many. Some loggers use a torch of burning wood, as resinous pine; others carry live coals from one pile to another; others use a long-handled torch; others, again, pour a little oil on the brush and start it with a match. The most satisfactory seems to be an ordinary tubular torch with wicking and a ferrule into which a rake handle can be inserted. A good substitute, though a crude one, for the last is a piece of bagging or burlap wound around an iron rod or stick of wood and occasionally saturated with oil.

The cost of burning piled brush in the coniferous forests may vary from one to thirty cents per thousand, according to the manner in which the brush is piled, the condition of the brush, the size of the crew needed to prevent the running of fire, etc. Commonly, it ranges from five to fifteen cents per thousand feet. Where the

*Plate IV appeared in the October number of AMERICAN FORESTRY.



Plate VII, Fig. 1—A Mountain Trail Built for Fire Patrol

cost has been higher than this, it has been attributed either to poor work in piling or to inefficient management in the work of burning. The average cost of both piling and burning should range in coniferous forests between ten and fifty cents, and as the lumbermen become more experienced in performing the work the cost will be correspondingly reduced.

In the logging operation shown in Plate IV, where the brush was burned just after a slight snowfall under particularly favorable conditions, the actual cost of burning was only a fraction of one cent per thousand feet. No watching of the piles to see that fire did not run was necessary; it was simply a case of walking from one pile to another and starting the fire.

In some coniferous forests careful records were kept of the area actually burned over. Where the stand per acre ran from 10,000 to 50,000 feet per acre, the aggregate area burned over by the brush fires was found to be approximately seven per cent of the total area cut over in the logging operations. Where the brush is burned as the logging proceeds, the percentage of the area burned over is less.

Disposal of Hardwood Brush

Most of the work of piling and burning brush has been in coniferous forests. Of late, however, there has been considerable discussion of burning the slash after logging in hardwood forests. So far as the author is informed, systematic brush burning after hardwood logging has not been conducted anywhere on a large scale or in a manner to justify a judgment as to its practicability. Hardwood tops are necessarily large, heavy, and awkward to handle. The cost would be much greater than in coniferous forests. It is probable that lopping and scattering will be used rather than piling and burning.

The author has conducted some experiments in the burning of hardwood brush in the second-growth forests of New England, where the wood was utilized to about three or four inches, so that the amount of brush to be disposed of was much less than would have remained from logging old timber in the ordinary manner. The results of these experiments showed the average cost of piling and burning to be between ten and twenty-five cents per cord. In this class of material with good organization the cost would probably not exceed ten to



Plate VII, Fig. 2—A Plowed Furrow that Stopped a Surface Fire

fifteen cents per cord, though these figures furnish but scant basis upon which to make calculation of the cost of piling and burning the brush and débris from an ordinary hardwood logging operation, where the size and number of the limbs would be very much greater.

Lopping of Tops

In some forests the burning of the brush may be unnecessary or actually undesirable. A method of brush disposal applicable in many forests is to lop off the branches from the tops and leave the material on the ground. The purpose is to bring all the brush in close contact with the ground, so that it will absorb moisture more readily, dry out less in summer, and decay more rapidly than when propped high above the ground.

So far as the author is informed this method was first used on an extensive scale in the Adirondack Mountains in lumbering spruce and pine. At first the plan was to cut off only the upper branches of the top as it lay on the ground. This left the stem still propped above the ground. (Pl. VI,

fig. 1.)* The next step was to cut off the under branches and lower the whole mass to the ground. The heavy snows during the first winter after cutting flattened down all the branches. (Pl. VI, fig. 2.) In this condition the brush absorbs moisture so rapidly that after three years there is little risk of fire.

This method was first used in private shooting preserves, mainly to prevent the tops from obstructing the hunter's view. It also enables a freer movement over the ground and facilitates the fighting of fires.

A later development of the method is to cut up and scatter the branches about over the ground. This has been used in the cuttings on second-growth woodlands when the amount of material left after cutting the cordwood in the tops was small. It has also been extensively used in certain National Forests in the dry districts of the West, where the scattered branches serve as protection to the soil and aid reproduction.

*Plate VI appeared in the October number of AMERICAN FORESTRY.



Plate VIII, Fig. 1—A Fully Cleared Fire Line in the San Gabriel Mountains

The cost of lopping the tops of spruce in the Adirondacks was twelve cents per thousand feet of lumber cut.

Lopping is the most advisable method of brush disposal under the following conditions:

(1) Where there is very little danger of fires starting.

(2) Where the region is moist and the branches will absorb moisture quickly.

(3) When the forest is so dense that piling and burning is impractical.

(4) Where the custom of logging and of utilizing the crown is such that the greater part of the tree is utilized and but little crown is left, while what is left will not be especially dangerous if thoroughly lopped and scattered.

(5) Where the scattering of the branches is necessary or desirable to protect the soil and small seedlings from drought or frost.

Broadcast Burning

For a number of years it has been the custom of certain lumbermen to burn their slashings, in order to protect valuable standing timber on neighboring areas. There is usually no attempt to regulate the fire within the

area burned, and all living trees and young growth upon it are destroyed along with the brush and débris. From the standpoint of forest production such fires are very destructive.

The principle of broadcast burning may, however, be used to advantage in making clear cuttings, provided the fire can be confined to small areas and fully controlled. Thus, in making clearings in patches and strips in certain of the National Forests, the slashings are burned on the ground without piling. This method is now under trial in some of the clear cuttings in the northwestern National Forests, where, in addition to the slash from the cuttings, there is a great accumulation of débris and the litter and humus is very heavy. In some instances this débris and litter is a hindrance to reproduction, as well as an invitation to fire, and its destruction is beneficial. The heavy loss of humus which must accompany so hot a fire may be more than counterbalanced for the forester by the improved conditions for reproduction of the species desired. The expense of piling all the slash and débris would under these conditions be very large, probably not less than



Plate VIII, Fig. 2—Location of Fire Lines in the Angeles National Forest, Cal.

from \$1 to \$2 per thousand feet of timber cut.

In order to control the fire in burning over the ground broadcast, ample fire lines should be constructed around the outside of the areas to be burned. These should usually be not less than one rod wide and should be entirely cleared of inflammable material. The material in the lines may often be thrown on the side of the cut-over area and burned with the other *débris*, but if this would make a dangerously large pile near the line it is better to burn it in piles on the cleared space.

The burning should be done with great caution. A time should be selected when the slash is dry enough to burn well, but not so dry that it will be impossible to confine the fire within the fire lines. The best time is usually when the slash in the open, cut-over area has just dried out sufficiently to burn, and while the contiguous forest is still too damp to burn freely. In the case of wide, cleared strips it may be advisable to construct a fire line through the middle, as well as along the edges. Very often the logging trails can be used for intermediate fire lines for the con-

trol of the burning, and in this way the expense of making special lines may be partly saved.

In the work of burning it is usually advisable to have a crew of at least ten men, properly equipped with fire-fighting implements, in order to control the fire. So far as possible only small portions of the area should be under fire at one time, especially when there is any possible danger of the fire spreading to the adjoining woods.

There is no question that this method is much more dangerous than burning brush in piles, and for this reason the latter method should be used whenever possible. A great objection to broadcast burning is that any remaining trees, reproduction, or young growth, already started on the cut-over area, are almost inevitably destroyed.

Annual or Periodic Burning of Litter

In many places, notably in the pine districts of the South, it has been the custom to let surface fires run through the woods every year, usually in order to improve the range. This is defended on the theory that if the litter is allowed to accumulate for a number of years,



Plate IX, Fig. 1—Fire Line Cleared near Railway

a fire would be so severe as to kill all the timber, whereas an annual fire burns only the year's fall of leaves or needles, and does little damage to the standing trees. Where the trees are tapped for turpentine the litter is raked away from the boxed trees so that the fire will not reach them.

There is no question that in the unprotected yellow-pine forests this custom has resulted in saving a large amount of old timber, but it has also retarded the reproduction of the forest by killing off young growth and seedlings in their tender stage. Deliberate burning of the litter as a protective measure is justified only under special conditions and only on selected areas. The considerations bearing on the use of fire in this way are:

(1) It should never be used except where absolute fire prevention can not be assured and there is real danger resulting from heavy leaf litter.

(2) It should be used only in stands in which there is no reproduction that it is desired to conserve.

(3) It should be used only where the benefit in fire protection more than offsets the injury to the soil resulting from repeated burnings.

(4) It should be used only with very fire-resistant species.

(5) It should be used only when the trees are old and large enough to have developed the corky bark necessary for resistance to the heat of the fires

(6) It should be used only when the fire can be controlled.

The burning is done best in early spring, when the loose litter is dry but the ground below is damp, the purpose being to burn only the upper litter.

In many places it is very difficult to control the burning without the use of fire lines. A tract divided by roads and paths into small blocks presents a simple problem, for each block may be burned separately, and there is no danger of the development of a fire too large to control. On large tracts without roads, ground-cleared fire lines may be used to protect areas of young growth, or they may be developed at certain points to aid in the control of broadcast burning.

Annual burning for fire protection is never justified where it can not be systematically controlled. The practice in many parts of the South and West, of setting out fires to burn off the litter and brush, usually for the sake of a better range, can not be justified, for the fires are uncontrolled; and they destroy an immense amount of young growth and otherwise damage the for-

est. Merely setting fire to the woods without control is nothing less than forest destruction.

FIRE LINES

Broadly speaking, a fire line is a cleared strip in the forest used as an aid in the protection from fire. It may be a road, a trail, a river or stream, a line cleared especially for a fire break, or a plowed furrow. The purpose of fire lines is to check or stop fires and to facilitate fighting them. A small surface fire may be stopped entirely by a road or even a path. Some surface fires are easily checked in their progress by narrow fire lines; others can be stopped only by very wide lines. Crown fires and surface fires of unusual severity will readily leap across even very wide fire lines. Fire lines, therefore, should not be built with the idea that they will *always* stop fires. They are intended to serve primarily as an aid, and often are an indispensable aid, in controlling fires and preventing their spread. Even when they do not actually stop or check a fire they serve as vantage points from which the fighting crew may work. Their establishment usually makes the woods accessible, so that a crew can get to a fire or near it quickly with appliances for fighting it. If back-firing is necessary it can often be done best from the fire line.

Fire lines differ very greatly in construction and width, according to local conditions of fire danger and of special forest organization. They will be discussed under the following heads: (1) Roads; (2) trails; (3) special fire lines.

Roads

An ordinary dirt road ranks as one of the best of all fire lines. The wider the road the more effective it is. A forest well cut up with roads is, therefore, much more easily protected than one with few or no roads. In Europe every well-organized forest has a thoroughly planned network of roads. These are located primarily with reference to the

problem of logging, but they serve also as a network of fire lines, and special lines are cleared to supplement them where necessary. Every part of the forest is readily accessible not only for patrolling for fire during the danger season, but for the quick transportation of fire-fighting appliances. In case a fire should start in this forest and be discovered within a reasonable time it would be easy to confine it to a small area.

We can not expect to have such a well-organized system of roads and fire lines in our forests for a long time, but much can be done in the way of utilizing the more or less temporary roads that are used in logging and afterwards abandoned. This is particularly true in the second-growth woodlots.

In most woodlots there are a great number of old wood roads, often badly overgrown with weeds, brush, or trees. If these are kept clear they are of great value in fire protection. They make the different parts of the woods accessible and offer points from which the fighting crews may work. The author has in mind a tract in Pennsylvania which was burned over in 1909 with great loss, but which might easily have been saved had the old roads been clear.

It is usually impracticable, on account of the expense entailed, to keep all the roads free of leaves, grass, etc., but they may be kept brushed out with very little cost. The author recently had some work of this sort done on a Pennsylvania tract, eight years after abandonment of the road, for less than \$3 per mile. It may not always pay to repair bridges and restore badly washed roads, but in almost every second-growth woodlot most of the overgrown roads may be reestablished sufficiently for fire lines with very little cost.

Trails

The first object of trails is to open up a forest and make it accessible for patrol and for fighting fires. In the National Forests this work of trail construction constitutes the first step in



Plate IX, Fig. 2—A Fire Line in the Adirondacks

organizing for fire protection. In undeveloped mountain regions it is impossible without good trails to get to a fire in a reasonable time and with means for fighting it. The trails in the National Forests are permanently constructed and are designed for saddle and pack horse travel. (Pl. VII, fig. 1.) While their first purpose is to facilitate patrol and access to a fire, they may be used as starting points for back-firing, and will often check or actually stop a small surface fire.

Special Fire Lines

When there are no roads or trails which will answer the purpose, it may be advisable to construct special fire lines. (Pl. IX, fig. 2.) Special fire lines are necessarily expensive, and are used where the property to be protected is very valuable. They are most used in woodlands in the better settled portions of the country, where land values are relatively high. In many cases it is advisable in a valuable woodlot to construct here and there a special fire line at points where it is not worth while or practicable to build a road or trail.

Thus, special lines are frequently run along the boundaries or at strategic points connecting roads. It is a sound principle, however, that special fire lines should never be built where a road or trail can be used for the same purpose.

In the less intensive forest conditions, such as occur in the lumber woods, special fire lines have so far been constructed only under exceptional conditions. In a large forest, the first work is to open up the area for communication by the construction of trails, and, where possible, of roads. Like all other work in forestry involving an investment, the use of fire lines must be based on sound business principles. They should be used only where necessary and where their expense is justified by the returns.

Special fire lines may be classed under the following heads: (a) Fully cleared lines; (b) tree-cleared lines; (c) ground-cleared lines.

Fully Cleared Lines

The ideal fire line is a completely cleared strip, from which are removed

not only the trees and brush but also all ground débris down to the mineral soil.

Fully cleared lines are advisable when the risk of fire is very great, and adequate protection can be secured only by having a clear break which will either stop or check possible fires. Such lines are necessarily expensive to construct and maintain. They are, therefore, used only when the property is valuable and the damage from a fire would be very great, as, for example, to protect nurseries, plantations, or valuable blocks of timber.

They are especially necessary whenever fire will run swiftly and it may not be possible to reach the fire promptly with fighting appliances. A conspicuous example of the necessity of such

fire lines and of the service rendered by them is found in the chaparral zone of the mountains in southern California. (Pl. VIII, fig. 1.) The preservation of the chaparral cover is of great importance in protecting the local watersheds. The area is large, the mountains are rough and difficult to travel, and fire runs with great rapidity. Fire lines are very necessary in such localities to control any fires that may start, and they must be of a character to stop fires, or to check them to such an extent that they can be controlled. The Government is, therefore, building extensive trails for patrol to prevent fires, and supplementing them by wide, cleared fire lines to stop any fires that may start.

(To be continued)

RANDOM TALK ON FOREST FIRES

ONE of the telling points made by Gifford Pinchot in his address at the recent congress at St. Paul was this:

"When any great movement has established itself so firmly in the public mind that a direct attack on it will not pay, the regular method is to approve it in general terms and then condemn its methods and its men."

In the State of California, for instance, this is precisely the way in which certain interests that would like to discredit the national forest policy as a whole, but despair of doing so because it has the solid endorsement of the people, are at present seeking to discredit its methods, particularly its methods of fire protection. These interests are of two classes; the great combinations of capital which are fighting against any control of national resources, and certain private and corporate owners of timberlands within the state. It is the latter class which has recently worked up an organized

attack upon the whole principle of protection against forest fires as practiced by the national and state governments.

This attack is well illustrated by an article in the *Sunset Magazine* for August, signed by George L. Hoxie, who had as collaborators, the editor states, S. O. Johnson and G. X. Wendling. All of these men have exceedingly widespread interests in California timberlands. Mr. Hoxie's article attacked the Forest Service for trying to keep fires out of the national forests, and advocated what the author terms employing fire as "a servant" to burn over the forest floor so as to do away with inflammable material.

As the deputy state forester of California, Wm. C. Hodge, points out in a communication to the *Timberman* for September, Mr. Hoxie's misunderstanding of the Government timber-sale policy is shown in the *Sunset* article to be almost perfect. Mr. Hoxie says that "The 'practical' invites the aid of fire as a servant, not as a mas-

ter." "One of the conditions inserted in every Government timber-sale contract," replies Mr. Hodge, "is to the effect that the brush, limbs and other debris caused by lumbering operations shall be piled in such a way that it can be burned when the logs have been removed from the area." Mr. Hoxie further says: "Milling operations in practical forestry, would consist of simply a harvest of the ripe and mature timber and cleaning thereafter by the use of the servant fire." "It would be difficult," returns Mr. Hodge, "to summarize the Government policy more accurately"*

With regard to Mr. Hoxie's statement that practical men do not approve of the protective methods employed by the Government, Mr. Hodge writes as follows:

"This is very far from being the case. The most important lumbermen of the state are in complete accord with the Government policy (which is also the policy of this office), and some of them whose holdings are intermingled with those of the Government turn over the matter of fire protection to the Government, simply paying the cost of patrol and fire fighting according to their acreage. Practically all of the big lumbermen have some of their employes appointed state fire wardens. These men have power to arrest for violations of the state fire laws, to summon assistance in fire fighting, and to issue permits to burn dangerous areas under such restrictions as will prevent the escape of the fire."

Frank H. Short, of Fresno, the well-known attorney for power companies in California, and the confessed opponent of Federal control over natural resources, has recently come forward as one representative of the extensive interests which are attacking the specific methods of conservation while commending it in general terms. In a communication addressed to the President of the California Board of Forestry, and printed in the *San Francisco Chronicle* for October 2, Judge Short even goes so far as to recommend, among other things, "intelligent back-

firing and other methods of removing inflammable material." Does Judge Short know what back-firing is, or is he simply helping out his allies by borrowing their method of talking at random?

Another active participant in the organized assault is T. B. Walker, of Minneapolis, whose holdings in California embrace some 2,000,000 acres, with a stand of not less than 40,000,000,000 feet valued at \$80,000,000, and who is not cutting his timber, but keeping it locked up most effectively. Mr. Walker's holdings are equal to one-half of the total stand of timber owned by the Federal Government in the State of California.

The *San Francisco Chronicle* published on August 17 a further installment of the propaganda devoted to the spread of this advanced doctrine that the way to conserve forests is to protect the standing timber for speculative advances by burning up the young growth, and leave the future of the forest, after the profits have been pocketed, to the care of any agency, public or private, that may like the looks of the investment.

The absurdity and mischievousness of this doctrine apparently did not prevent its gaining the endorsement of Secretary Ballinger, who is quoted in the *Washington Evening Star* of August 25 as having said: "We may find it necessary to revert to the old Indian method of burning over the forests annually at seasonable periods."

If this sort of thing were the alternative of public protection of forests from fire, the life of the forests in private lands would be brief indeed.

But the state forester of California, G. M. Homans, knew very well what was going on, and he was watchful. In the *Sacramento Union* of August 22 he entered prompt and vigorous protest against the theory put forward by these foresters of the counting-house. His communication is as follows:

In one of the San Francisco dailies of August 17, an editorial appeared attacking the practice of patrolling and preventing forest fires from raging through the forested lands of the country. The article

*Further details of this policy may be found in the current installment of Mr. Henry Graves' discussion of "The Protection of Forests from Fire.—Ed.

advances the theory that the *débris* of the forest should be burned at frequent intervals, referring to the example set by the "untutored Indians," as a measure of protection. Another writer expounds the same theory in the August number of *Sunset*.

It seems that these writers have become slightly tangled in the meaning of forestry, and have lost sight of what it is endeavoring to accomplish. They have evidently misconstrued its meaning and aim to be the protection of standing, full grown saw timber *alone*. The term is much broader than this. Those who are practicing forestry are bending their efforts, with marked success, toward the protection of the young, growing trees which are developing into valuable saw timber, as well as the protection of the matured timber from destruction and waste by fire.

If the present stand of matured timber were the only thing to be considered and protected the problem would be an exceptionally easy one, and the theory devised by the above-mentioned writers could be used from a practical standpoint. However, the problem confronting the lumbermen and the foresters of this country is more than the protection of standing mature timber. The problem is to prevent the now standing merchantable timber from destruction until it can be converted into lumber and *also* to prevent the land on which these valuable forests are now standing from becoming a barren waste, a sea of brush, after the mature timber has been utilized.

When one stops to realize that a yearling pine or fir tree is no larger than a match and is so tender and sensitive to external conditions that the heat from a fire, even though that fire is no larger than that made by a burning pine needle, will kill it, and when it is considered that a three-year-old tree will be killed by the heat thrown out by three pine needles burning at its base, the advisability of burning over the forest floor takes on a different aspect.

How are we going to burn over the forest areas of the country at frequent intervals and at the same time provide for the development and growth of the new stand of young trees which should take the place of the saw timber which our mills are consuming, thus preventing the land from becoming absolutely worthless?

Through the methods used by the "untutored Indians," and through the carelessness and mismanagement of the old-time lumbermen throughout the United States, there are thousands of acres of land which

once produced valuable forests but are now absolutely worthless, producing nothing but brush.

There are other vast areas where only the old mature timber is standing—where successive fires have destroyed all the young growth.

The foresters of the country are now endeavoring to reclaim these barren wastes, through natural and by artificial means, to *young* forests and to assist the young trees to get a start on the areas where only scattered mature timber is now standing.

The only practical method of accomplishing this aim is to keep fire out until after the young forest is past the stage of extreme sensitiveness to heat, at which time the forest policy will, no doubt, be so established that sums of money can be appropriated for the purpose of going through certain sections of forest land, small areas at a time, piling the fallen logs, branches and *débris*, and burning these piles in a practical, systematic manner at the right season of the year, just as the United States Forest Service is doing to-day in timber sales after the logging operation has been completed.

It is certain that from a business standpoint and from every other point of view, the forest lands should not be left a worthless, fruitless desert after they have been stripped of their present valuable product. What are our mismanaged cut-over lands of to-day producing? What will the lands which now bear only the mature trees produce after they have been logged over? How can we increase the value and productivity of both these classes of lands? Simply by protecting them from fire.

In two hundred years from now lumber will be just as much in demand, if not more so, by the citizens of this country, as at the present time. There are no new forests to discover and to utilize, and so why should we as the present occupants manage our lands and forests for the selfish aims of to-day alone, when by a little care and with a comparatively slight expense we could leave the country still producing and our forest lands in such shape that our mills can return to these selfsame lands for a second, a third, and innumerable cuts in the future, after we have completed our span? Such a thing is possible, but not through the agency of fire, even as a servant, applied in the manner recommended by a few, because the growing stock and the nucleus of the future stand has not been considered in the protective measures.



EDITORIAL

The Growth of a Great Policy

AMERICAN FORESTRY has from time to time during the last few months reported to its readers the changes made, both by addition and subtraction, in the area of the national forests. These changes, as has been explained, are the result of the careful studies and surveys that began some time ago under Mr. Pinchot and have been carried out to their results since.

Because of the prejudice and misrepresentation that has been so carefully cultivated by some elements in the national forest states it needs to be borne clearly in mind that the boundary changes indicate no change in the national forest policy but carry out what was a part of the plan from the beginning—a rectification of boundaries in accordance with the results of careful surveys, a perfecting of a vast system. Necessarily these extensive and unmapped areas in a wild and mainly mountainous country had to be roughly blocked out in the first instance. Later, as an administrative force was developed, came the opportunity to carefully determine the character of the country and the desirability of including additional forest lands or watersheds, or excluding certain lands not so useful for forestry as for other purposes.

Thus far about half as much land has been added to the national forests as has been taken from them. Many of the plans for the changes were made prior to the change of administration of the Forest Service, and these and additional modifications along the same line have been and are being carried out by the present Forester, Mr. Graves, in full sympathy and accord with the policy of his predecessor, Mr. Pinchot. The areas involved in the changes are considerable, taken by themselves, but

very small in comparison to the whole area of the forests. If we were to judge from some of the complaints that have come out of the West and from some of the oratorical efforts of certain western senators and representatives we might suppose that a great amount of fertile agricultural land was being kept from settlement and the prosperity of the West largely hampered thereby.

Frankly, we do not believe this to be the case. If all of the national forests were to-day thrown open to settlement on the most liberal terms, we doubt if many hundred actual settlers would avail themselves of the opportunity. The mountain sides of the Rockies, the Cascades, the Olympics and the Sierras, where the forests chiefly lie, are not of great agricultural value, and the opportunity so offered would be mainly availed of by large operators intent upon gleaning some immediate profit from the national heritage.

Against this the whole principle of est conservation is directed. The idea of a national forest rests upon the greatest good of the greatest number, the right of all the people to share in the common property of all, and the permanent need of forests, especially in mountain regions, as one of the chief foundations of lasting national prosperity. That these principles are sound no unprejudiced student of the world's economic history will deny, no real patriot, no true American, will wish to deny. The development of our national forest system by Hough, Fernow, Roth and Pinchot, under the wise counsel of Secretaries like Noble, Hitchcock, Morton and Wilson, through the administrations of Harrison, Cleveland, McKinley and Roosevelt, has been in the direction of laying these foundations broad and deep. The present ad-

ministration is building, as its successors will continue to do, upon these foundations, and no responsible public official will ever undertake to undo this great and statesmanlike work.

When later history is written there will be found no record of more sagacious administration than this steady up-building of the national forest policy.



The Southern Conservation Congress

THE Southern Conservation Congress at Atlanta was not great in point of numbers or in accomplishment, but as an indication of the general awakening of the country on the great questions that lie at the root of American prosperity it was significant and will sow good seed. It was worth holding for the excellent declaration of principles it produced if for nothing else. In many ways this statement is one of the most clear, well-balanced, and dignified documents that has come from any of these gatherings.

From the opening sentences in which we find emphasis laid on the fact that "such conservation of our natural resources as is consistent with their proper and wise utilization is a deep moral obligation," this declaration abounds in telling phrases and clear-cut definitions. Another statement worth noting, in which we shall find a text for later comment, is the affirmation that "the federal government has the constitutional right amounting to a national duty to acquire lands for forest purposes in the interest of a future timber supply, watershed protection, navigation, power, and the general welfare of the people."

Incidentally in this connection the question may be raised whether this business of holding big congresses is not being somewhat overdone. They have come too closely together in the last few weeks for any one of them to leave a clear impression. They are so frequent that it is becoming difficult to secure the attendance of delegates, for busy men cannot devote themselves

wholly to conventions, and a few who are favorably situated to bear the cost in time and money really form the moving force of all of them. They are productive of immense good, but they ought to be spaced a little farther apart and so planned that each could have its full weight and effect.

If the present tendency continues we shall need a central bureau to plan our annual program of congresses, so that conflict may be avoided and a reasonable attendance and effective activity be assured for each one.



A Recognized Public Need

IN THE Second Conservation Congress at St. Paul there was general recognition of the Southern Appalachian-White Mountain forest bill as the most pressing and immediate conservation measure. It was not looked upon as a question for argument. It was an assumed fact. The same was practically true in the Eighteenth National Irrigation Congress. These two bodies were truly representative of the people of the United States. The second is distinctly western, but it stands for the national spirit and not for the narrow sectionalism voiced by some of the northwestern governors at St. Paul. Some persons like the junior senator from Ohio may still see opportunity for satisfying vanity by holding up this measure, or regard themselves as having a special mandate to be the better judgment of the people against all comers, but the only result will be to increase the ultimate cost of the project, for the intelligence of the country has long ago given its decision in the affirmative and will not be permanently cheated of its will.

The present measure, the Weeks bill, is not perfect. Bills that have been through the fires of legislative strife and the chill of legislative compromise seldom are, but it has many merits from the legislative point of view. It represents the best form of legislation practicable at this time and it should be passed by the Senate without alteration

or amendment. It points the way to a policy that we believe to be good and should be given a full and fair trial. Its errors can be corrected when they have been found by actual test; its good points can be strengthened and developed to the nation's great profit.

The states directly concerned are stirring into action. The co-operation of the United States through the establishment and management of national forests as the center of a system of national, state and private forests throughout the eastern mountains will be of the highest value. The Weeks bill makes this possible. The people of the country ask the Senate not to delay an unnecessary hour in putting this bill upon the statute books.



The "Ultimate Consumer"

THE *New York Times* recently exhorted its readers editorially to dwell less upon those, ironically called "villains," who develop natural resources for profit, and more upon the consumer and his troubles. "The friends of conservation," it said, "need to think more about the ultimate consumer," and added that "if conservation is ever to be truly popular, it must in some manner operate toward cheapness."

But, if anything is clear, in both history and economics, it is that nothing whatever will "operate toward cheapness" with natural resources, except national retrogression. As long as supplies are abundant, national advance, with increase of population and a

rise in the level of efficiency, necessarily means a generally higher standard of living and a larger absolute and per capita demand for commodities; and these, in turn, bring a heavier drain on resources and powers of all sorts. In response to the law of supply and demand, prices rise accordingly. Nor is the tendency reversed by increased production, because production is always costlier than exploitation. With natural resources which cannot be produced, the inevitable outcome is a shortage, while history shows that in prosperous countries even the forests, the chief renewable resource, steadily increase in value under the most conservative and scientific methods of production, as, for example, in Germany. The conclusion is obvious enough. Higher prices for all raw materials are an invariable concomitant of economic and industrial progress. More than that, prices must sooner or later be raised deliberately in order to defray production cost and conservation charges, or else they will be cruelly forced upward by a famine of resources.

In other words, unless the consumer contributes his share toward supplying his necessities by investing in the process of producing and maintaining them, he must consume without producing, at constantly greater expense, and in the long run the store of resources must certainly be devoured. Then the ultimate consumer, ultimate indeed, will pass permanently from the scene with the exhaustion of the resources he has consumed. It is a case of productive and conservative outlay now, or eventually going without.



THE SOUTHERN CONSERVATION CONGRESS

While disappointing in the matter of attendance, and showing the lack of thorough preparation and of concentrated purpose, the Southern Conservation Congress held at Atlanta, October 7 and 8, produced some useful addresses, framed an important statement of principles and policies, and registered the convictions of the South on the fundamentals of conservation.

At the opening session, acting mayor E. E. Pomeroy, of Atlanta, welcomed the congress in the name of the city. Response was made by J. B. White, of Kansas City. The chairman, E. L. Worsham, then briefly stated the object of conservation and of the congress, and thereupon introduced Gifford Pinchot, who dwelt in his address upon the practical workings of the conservation idea where it has been tried, pointing out the need of extending it, particularly in the South, and showing the opportunities for individual service. With reference to the opening for the practice of forestry in the South, Mr. Pinchot said:

The South has to-day the best of chances for the application of practical forestry to her great timber tracts. What the results will be have been amply proven at Biltmore, where magnificent forest preserves have been brought out on some of the poorest lands in the Piedmont region.

The first step to take in the preservation of your forests is to make it easy for the man who wishes to put it into practice on his own lands. Give him something adequate in the shape of fire protection and, if necessary, exempt him from taxation at least to a certain extent. There are thousands of men who would take up the work if encouraged as they might so easily be.

In the second place, every southern citizen should make it his duty to demand of his senator that he vote for the Appalachian and White Mountain preserve bill, which comes up before the United States Senate the middle of next March. Far-sighted southerners have been fighting for this bill for the past twenty years, and they have a better opportunity of having it passed now than ever before. The House has already passed the measure, and with the pressure that the South can bring to bear, it will pass the Senate without the shadow of a doubt.

Addresses by Governor A. E. Willson of Kentucky, B. N. Baker of Baltimore, and H. L. Whitefield of Columbus, Miss., followed.

Charles S. Barrett, president of the Farmers' Union, contributed a paper to the proceedings.

At this session E. L. Worsham was elected president of the congress and Dr. N. P. Pratt of Atlanta was elected Secretary.

Conspicuous in the afternoon session of this day was the address by Dr. C. W. Hayes, chief geologist of the United States. Besides giving a number of striking examples of waste in the utilization of Southern mineral resources, Dr. Hayes came out boldly for the view that a full share of the burden of conservation must be borne by the consumer. He insisted that the conservation of natural resources means higher present cost of raw materials and hence of the finished product.

At this session important addresses were delivered also by A. L. Ponder, attorney for, and Henry E. Hardtner, Chairman of the Louisiana state conservation commission, and F. M. Miller, member of the Louisiana legislature, outlining the progressive methods by which Louisiana has recently secured the passage of thirty conservation bills. Other speakers were Dr. A. M. Soule, president of the Georgia Agricultural College, whose subject was "Conservation in Agriculture," and the presiding officer, Charles J. Haden, a member of the executive committee of the Greater Georgia Association.

At the morning session on the second day of the congress, President K. G. Matheson of the Georgia School of Technology presided, and the first address was by J. Girvan Peters, of the U. S. Forest Service, who had for his subject "The Work of the Forest Service in the South." Mr. Peters outlined the history and present status of the lumber and turpentine industries in the South, explained the methods by which the Government co-operates with states and with private timberland owners in working out concrete problems in policy and forest management, indicated the desirable legislation which has been passed by Southern states as a result of information obtained as to their respective needs and opportunities for forestry, and described briefly the principles by which the Government manages the national forests in the South, the Ocala and the Chostawhatchee in Florida. Finally, he made reference to the proposed establishment of national forests in the Appalachians in these words:

Before concluding I desire to say a few words about the Appalachian bill. I want

to remind you that if this bill becomes a law the sum of \$200,000 will be appropriated by the Federal Government to enable the Secretary of Agriculture to co-operate with the states, when requested to do so, in organizing and maintaining a system of fire protection on private or state forest lands situated upon the watersheds of navigable rivers. The amount expended in any state will not exceed the amount appropriated by that state for the same purpose in the same fiscal year. No agreement will be made, however, with any state that has not provided by law for a system of forest fire protection. In order, therefore, that the Southern states may take advantage of this provision in the proposed law I can not urge too strongly the organization of such protective systems.

The next speaker was Dr. W J McGee, soil-water expert of the U. S. Department of Agriculture, whose subject was the conservation of the soil. Dr. McGee pointed out that the soil products of the south are three times as valuable as the mine products, and contended that whatever threatened the productivity of the soil should not be suffered to go unchecked. "The water supply of the United States," he said, "is only one-half enough to make all our territory productive, as it is, and this shows how imperative is the need to save every drop of this supply." In conclusion, he added:

To this end we must begin immediately the conservation of the forests at the head of our streams. In the state of nature in this section, the streams were clear as crystal, while now they are red with the blood of the land which is being washed away to some day build up an empire in the Gulf of Mexico. Freshets, such as we now have as

a result of deforestation are ruinous to both hills and valleys alike and must be checked if we would save our one most valuable asset—our soil.

J. B. White of Kansas City followed with an address on "The Lumberman's Interest in Conservation." The most important point made by Captain White was that lumber is now, and always has been, sold for less than its true value. In discussing this he followed closely the lines taken the day before by Dr. Hayes. He contended that "If forest conservation is ever to be a success, lumber has got to be worth more money than it is now. It must bring what it will cost to produce it. It is our duty to educate the people to this fact, and that if conservation comes the people will have to pay the bill. There is no way of saddling this cost upon the lumbermen. It has got to come fairly upon all classes."

The remaining speakers at the morning session were Mrs. J. K. Ottley; Dr. J. Hyde Pratt, president of the Appalachian Good Roads Association; J. H. Finney, Secretary of the Southern Appalachian Association, and Dr. Thomas D. Coleman of Augusta.

President Worsham presided at the closing session, the first part of which was

taken up by the address of Philip Werlein, president of the New Orleans Progressive Union and short speeches by a number of the more prominent persons present. The closing address was by Theodore Roosevelt, who touched upon the need of forest conservation in the South, as follows:

The South has the last hardwood forests of great industrial value on the North American continent. There are coniferous forests placed elsewhere that are not exhausted. I hope the South will use those hardwood forests in such fashion as to get the very utmost business value out of them of which they are capable, provided that the use is always conditioned upon keeping the forests so that our children and children's children shall have their portion of the benefit from them. Cut every big tree that is worth cutting, cut all the timber that can now be used, but cut it in such fashion and use such safeguards that the forests will still remain, that the young trees will remain to grow up in their turn into trees that can be used by your children and your children's children in their turn. Treat each forest as an asset of the country as a whole, as the wise farmer treats his land as, not a merely personal asset for himself, but as an asset for his family.

I hope that Congress will pass the bill for the creation of the great Appalachian forest. Those forests lie in several different states. The waters which rise in them go through more than one state, and it should be peculiarly the work of the national government to see to their preservation. I hope that every one of your representatives in Congress will bestir himself in this matter.

Before adjourning, the Congress adopted the following:

STATEMENT OF PRINCIPLES AND POLICIES

This Southern Conservation Congress in session assembled in the City of Atlanta, State of Georgia, on this 8th day of October, 1910, after full deliberation on matters of vital moment to the people of the South, and through them, to the people of the entire Nation, does hereby adopt and declare the following statement of principles and policies.

We hold firmly and unalterably that such conservation of our natural resources as is consistent with their proper and wise utilization is a deep moral obligation, and that only through recognition and observance of this obligation can the perpetuity of our people be assured.

Pleading for posterity whose rights we hold to be a sacred trust, we enjoin our generation against all needless waste of those abounding resources with which our country is blessed.

Holding it within the legal power of the state as fixed in the Constitution and established by a decision of the Supreme

Court of the United States to protect the common interests of the whole people against individual encroachment, we urge upon our states a fuller realization of their responsibility for guarding the interests and rights of their citizens in the natural sources of prosperity.

Recognizing the running waters of the country as a great natural resource, we hold that they should be administered by the Federal Government and the State Governments within their respective jurisdictions in the interest of all the people; and we urge that the waters be utilized and conserved in accordance with the principle of the greatest good to the greatest number for the longest time.

Viewing purity of water supply as essential to the public and general welfare, we urge upon all municipal, state and federal authorities and upon individuals and corporations requisite action toward purifying and preventing contamination of the waters.

We urge the enactment of the Weeks Bill now pending before the Senate of the United States providing for protective forests, and we affirm that the Federal Government has the constitutional right amounting to a National duty to acquire lands for forest purposes in the interests of a future timber supply, water-shed protection, navigation, power and the general welfare of the people.

Approving the Federal forest policy and the endorsing of service whereby this policy is carried out, we urge upon our states the establishment of state forests and the enactment of laws insuring the conservation of forests in private possession; such laws to provide for more equitable taxation, prevention of forest fires and re-forestation of lands less valuable for other purposes.

We favor co-operative action on the part of states and the Federal Government looking to the preservation and better utilization of the soils by approved scientific methods.

We urge appropriate legislation by the states and Federal Government for the

protection of migratory birds, wild game, food fishes and fur-bearing animals.

Appreciating the scenic beauty of our land as a source of patriotism and as a means of promoting the happiness of our people, we urge on communities, municipalities, states and the Federal Government a higher appreciation of this element of public welfare and appropriate action looking towards its maintenance.

We recommend that the public and private schools instruct the youth of the land in the fundamental doctrines of conservation.

We realize that the fullest enjoyment of our natural resources depends on the life and development of the people physically, intellectually and morally, and in order to promote this purpose we recommend that the training and protection of the people and whatever pertains to their health and general efficiency be encouraged by all methods and legislation suitable to this end. Child Labor should be discouraged and child life protected and developed.

Realizing the appalling waste of human life in mining, transportation and other industrial operations, we recommend legislation increasing the use of proper safeguards for the conservation of lives especially of industrial employees.

Holding that the people of the country have a common interest in the mineral resources, we approve the establishment of a Federal Bureau of Mines to further the conservation of these resources and urge upon our states proper legislation to the same end, in order that current wastes amounting to an economic crime may be prevented.

Profoundly appreciating the splendid work of state conservation commissions and associations in awakening our people to the Conservation Issue, we urge upon our state legislatures the enactment of laws providing for the maintenance of such commissions with adequate funds for their work; and we call on all Governors of States which have not yet acted to promptly create State Conservation Commissions and clothe them with necessary powers.



EIGHTEENTH IRRIGATION CONGRESS

The Eighteenth Irrigation Congress, held at Pueblo, Colo., September 26 to 30, witnessed a revival of the controversy between Federal and state control of water resources which had given zest to the proceedings of the Second National Conservation Congress. Considerable bitterness of feeling was displayed by the advocates of exclusive state control, and a good deal of time was wasted in declamation and manipulation which might better have been devoted to constructive work. The advocates of Federal control repeated the victory which they achieved at St. Paul. The platform adopted is a strong conservation document.

B. A. Fowler of Phoenix, Ariz., was elected president of the congress, and Arthur Hooker of Spokane, Wash., was elected secretary. Following are the

RESOLUTIONS

This eighteenth convention of the National Irrigation Congress now drawing to a close, made up of duly appointed delegates from all the states west of the one hundredth meridian, and several east of that line, has been notable for the fullness and freedom of discussion concerning every aspect of irrigation. Much of the discussion has reached planes both high and practical and well worthy of preservation in permanent form for guidance in the future. Accordingly, we, the delegates here in session assembled, in the City of Pueblo, State of Colorado, on this 30th day of September, 1910, do hereby adopt the following declaration of principles and affirmation of policies and opinions.

Recognizing the waters of the country as the source of life and the basis of the habitability and productivity of the land, we hold that the waters belong to the people of the country, and that this right of the people in and to the waters is natural, inherent, inalienable and indefeasible.

Recognizing the necessity for administering this invaluable possession of the people by state and federal agencies, we deny the right of state or federal governments, or municipal authorities, to alienate or convey water by granting franchises for the use thereof in perpetuity, or without just compensation in the interest of the people.

Recognizing the interdependence of the various uses of the waters of the country, we hold that the primary uses are for drinking and domestic supply for agriculture through irrigation or otherwise, in which water is consumed, and that the use for navigation and for power, in which water is not

consumed, are secondary; and we hold that use of the water should be made with reference to all other uses for the public welfare in accordance with the principle of the greatest good to the greatest number for the longest time.

Accepting the fact that all parts of each drainage area are related and interdependent, we hold that each stream should be viewed and treated as a unit from its source to its mouth; and since the waters are essentially mobile and transitory, we hold that federal control is essential to the equitable distribution and utilization of the waters of interstate streams.

Since the better utilization of our waters for water supply, irrigation, navigation and power requires unification of the various administrative agencies of the Government having charge of the federal regulation and control of water and waterways into a single agency, we request our representatives in the Federal Congress to take early action looking to the creation of an appropriate agency for this purpose; such agency to be empowered to co-operate with states.

Viewing purity of water supply as essential to the public health and general welfare, we urge on all municipal, state and federal authorities, and on individuals and corporations, constant vigilance and requisite action looking towards purifying and preventing contamination of the waters.

Recognizing the establishment of the United States Reclamation Service, largely through the efforts of this organization, as one of the important steps in the development of this country as a home for a great and growing people, we heartily favor the continuation and extension of the service; and we re-affirm our full confidence in the integrity and capability of the officers of this branch of the public service.

Re-affirming the conviction of the last Congress as to the importance of irrigation by private enterprise, we note with gratification the response by the Federal Congress and the Census Bureau to our demand for complete statistics concerning irrigation, and we commend this subject to the consideration of future sessions of this Congress.

Adhering to the principle of local self-government, we urge co-operation and organization for mutual benefit among irrigators, and advocate provision for irrigation districts by the legislatures of all states in which irrigation is practiced.

Recognizing the economic waste and menace to the public health connected with our vast areas of swamp and overflow lands, we request our representatives in the Federal

Congress to take suitable action looking toward the reclamation of such lands under a policy corresponding with that of the reclamation of arid lands by irrigation under the Reclamation Service; such reclamation of swamp and overflow lands to be carried forward through co-operation between individual owners, States, and the Federal Government.

Viewing adequate and economical transportation facilities as among the great and growing needs of the irrigable region, we approve the development of navigation throughout the rivers and lakes of the United States, in accordance with a comprehensive plan beginning with a deep waterway from the Great Lakes to the Gulf as the main artery of our inland waterway system, and extending to other natural waterways in the order of their magnitude and commercial importance.

Recognizing the close natural connection between forests and stream flow, especially throughout the irrigable region, we heartily commend the Federal Forest policy, and favor its continuance and extension; and we re-affirm our full confidence in the high integrity and exceptional intelligence of the past and present officers of the United States Forest Service.

Approving the progressive withdrawal of lands suitable for homesteads from the national forests, we hold that such withdrawals should be made in the light of expert investigation showing that the agricultural value of such lands is paramount to their value both for forest production and for stream protection.

We reiterate the declaration of the Irrigation Congress of 1907, 1908 and 1909 in favor of establishing national forests in the Southern Appalachian and White Mountains, and direct the attention of our representatives in the Federal Congress to the Bill for this purpose now awaiting final action at the next session of the Sixty-first Congress.

We favor the enactment of laws by the States to regulate the cutting of timber on state and private lands, and laws reforming taxation on timber lands, cut over lands and re-forested lands, to the end that the perpetuity of the forests may be assured and the flow of the streams be preserved.

It is the sense of this Congress that in the federal control essential to the equitable utilization and distribution of interstate streams, recognition must be given to the rights of all citizens who have effected valid rights of appropriation.

We commend the work of the United States Geological Survey, and strongly

recommend that more liberal appropriations be made by the Federal Congress and the Legislatures of the States for co-operation in the prosecution of the work of the topographic and water resources branches of this Bureau, including stream measurement.

We commend the irrigation investigations of the officers of the Experiment Stations of the United States Department of Agriculture and of the Agricultural Experiment Stations and State Engineering Departments, and urge more liberal appropriations by the Federal Congress and by the States for the work and co-operation of these agencies and for the more general distribution of the reports and bulletins recording their operations and results.

Holding that the inclusion of public lands in irrigation districts organized under state irrigation district laws, will beneficially extend the operations of such districts and materially aid in the reclamation of arid lands, we recommend to the Congress of the United States the enactment of a law authorizing the inclusion of such lands within such districts, with all the rights, liabilities and exemptions of lands in private ownership, under proper safeguards of the rights of the United States in its public lands.

It is the sense of this Congress that Federal and State Departments in charge of reclamation and conservation work should make accessible to the press the legitimate news of such departments as their work develops, to the end that the people may be informed rapidly and widely as possible on these important subjects.

We recommend that the President of this Congress appoint a commission of five to make a systematic study of the irrigation laws of the various states and to recommend to the legislatures thereof uniform legislation relating to irrigation.

Since the Dry Farming Congress is working in the interest of scientific soil tillage and conservation of moisture in order to reclaim all possible arid land by saving and utilizing all the available water, this Congress extends hearty wishes for the success of that organization, with the assurance that we appreciate the value of every step that will in any way result in placing a greater area of land under cultivation.

Since the expert knowledge of officers of the Reclamation Service has in the past been invaluable to the Congress at Large, and especially to the Resolutions Committee, we record our regret that this important branch of the public service was not more fully represented at the Eighteenth Congress.



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WHAT FOREST FIRES COST IN 1910

WHILE an accurate estimate of the total fire damage of the past season will never be made, enough is known to place the damage to standing timber in round figures at from \$175,000,000 to \$200,000,000.

The timber consumed, or damaged beyond hope of utilization before it becomes a total loss by decay, was roughly equivalent to the entire lumber cut of two years, assuming 40,000,000,000 feet as the average annual cut.

Since not more than one-third as much timber is grown as it takes to meet the yearly demand, it would take six years' growth of all the forests of the country to replace the supply wiped out by this year's fires.

The cost of fighting these fires was not less than \$1,500,000, and probably exceeded this sum.

Since the production of every thousand feet of lumber represents \$10 in wages, \$8,000,000 was lost to industry in wages. This is equally true whether or not an equivalent amount is spent for labor in salvage or in converting other forests into manufactured products; for in the long run, the reduction of the forest stock below the minimum required to meet the current demand means the depression of the lumber industry, curtailment of the cut, and consequently a diminished outlay for labor, with corresponding loss in wages.

Before the severe fires of August were more than a probability, this magazine placed the loss to property from the fires in the United States and Canada at about \$100,000,000. Since then the fires of the Northwest have caused losses of probably not less than \$25,000,000 in the national forests, and those of the Northwest and the Lake States together have destroyed not less than \$50,000,000 worth of timber owned by states and private persons.

Details are most complete for the losses to Government timber, and it is probable that state and private owners of timber suffered more nearly three times than twice as heavily as the Nation by these fires.

A comparison of the public losses with the private losses for the whole country indicates that the private losses were seven times greater than the public losses, in spite of the fact that privately owned forests are not more than five times greater in extent and are more accessible than those publicly owned.

To replace forests by planting on the 4,000,000 acres burned over would cost not less than \$40,000,000. It is likely however that over much of the area natural seeding from live trees left standing will furnish the beginnings of new growth.

No attempt has been made by AMERICAN FORESTRY to estimate the damage to young growth or to the soil. For much of the burned-over land this damage would increase the estimated losses two or three fold.

STATE WORK

New York

Commissioner Whipple Resigns

The commissioners appointed by Governor Hughes to investigate the Forest, Fish and Game Commission of New York have made their report. While recognizing the value of much of the work done by Commissioner Whipple, they criticize severely some of the methods of the office, particularly of the legal department. As a result of this, Commissioner Whipple submitted his resignation to the Governor. This, and the reply of the Governor, follow:

It is unfortunate that any questions of this kind have arisen in connection with the forestry work of New York, which has been so creditable in many respects. Mr. Whipple's service has been valuable not only in his own state but through the example which he has furnished for the forest work of other states.

October 3, 1910.

Hon. CHARLES E. HUGHES, *Governor*,
Executive Chamber,
Albany, N. Y.

My dear Governor:

I have read the report of the Commission appointed by you to investigate the administration of the Forest, Fish and Game Department. As a result of the criticisms made of my department, I desire to tender my resignation to take effect at once.

This is not the time to discuss either the facts or the conclusions set up in the report, but I do emphatically deny the truth of the facts stated and disagree from the conclusions reached. I recognize, however, that, as a result of this report, my usefulness to the State in this department has been destroyed.

I have held this position for six years. I was not an applicant for the position. I have come to appreciate the great importance of the work of this Department to the people of the State. I have heard New York State cited as an example in the conservation of its forests in many states of the Union. The work of my Department has increased many fold during my administration. It extends to all parts of the State. The work of this Department has extended along new lines,—some of it experimental. The field covered is so large that much of it must be intrusted to subordinates. That a critical examination cov-

ering the six years of my administration would disclose errors of judgment and mistakes made should be expected. I think a similar examination would show errors and mistakes in the management of any great business organization of the country. I will not attempt to offset these with the good that has been accomplished during the same time. I will only say that my conscience acquits me on any intentional neglect or dereliction of duty. I have given to the work my entire time and my heart has been in it. I have kept in touch with the friends of conservation in the State. It is a thousand times more important that this great work should go on and that it should not become a subject of political contention than that I should retain the office.

For these reasons, to relieve you of any embarrassment, and without solicitation on the part of anyone, I respectfully tender my resignation.

Very truly yours,
(Signed) J. S. WHIPPLE.

State of New York
Executive Chamber, Albany
October 3, 1910.

Hon. JAMES S. WHIPPLE,
Albany, N. Y.

Dear Sir:

Your letter of this date resigning your office as Forest, Fish and Game Commissioner has been received. It is impossible for me adequately to express the regret that I feel at the conditions which the investigation of your department has shown to exist.

Your work has been strongly commended to me by those who are interested in the protection of the forests and in the conservation of the State's interest in those important resources. You should have full credit with respect to those matters in which there has been increased efficiency; and I desire to believe, and I accept your statement, that you have not been guilty of wrong intention.

But the conditions which have been shown to exist cannot be ignored and must be immediately rectified.

Your resignation is accepted and under the statute took effect when it was received and filed in this office.

Very truly yours,
(Signed) CHARLES E. HUGHES.

NEWS AND NOTES

Indiana Forestry Association Formed

The Indiana Forestry Association is the name adopted for the new organization which is being promoted in Indiana by Charles W. Fairbanks and others to assist in the work of protecting trees and planting new trees in the waste places of the state.

The following will be the twelve directors and incorporators: Thomas R. Marshall, Governor of Indiana; Charles W. Fairbanks, former vice-president of the United States; Addison C. Harris, attorney, Indianapolis; William Lowe Bryan, president of Indiana University; Dr. John N. Hurty, secretary of the state board of health; Winthrop E. Stone, president of Purdue university; John B. Connor, editor of the *Indiana Farmer*; Mason B. Thomas, of Wabash College; Edgar A. Perkins, the newly elected president of the Indiana State Federation of Labor; George B. Lockwood, of Marion; Hugh J. McGowan, president of the Indianapolis Traction and Terminal Company; and Oscar Hadley, state treasurer.



Needed Forest Laws for Washington

The Washington commission on forest legislation, appointed by Lieutenant Governor Hay, has recommended to the executive and to the legislature the enactment of a law creating a state forestry department; another law providing state means for the reclamation of logged off lands on the ten-year bond issue improvement plan; a law providing for the submission of a constitutional amendment providing for reforestation of non-agricultural logged off lands, with exemption from taxation for a stated period, and, finally, a law enlarging the scope of the forestry department in the protection of the forests of the state from destruction by fire.



The Proposed Nebraska State Forest

A member of the Forest service has, at the request of the Nebraska Conservation Commission examined the tract of wooded land between Bellevue and South Omaha, Nebraska, which the commission desires to have the state purchase for forest purposes. In his report the forester favors the proposed plan. It is expected that the land would cost between \$100,000 and \$150,000.

\$5,000,000 from a Town Forest

A remarkable example of modern forestry is furnished by the little town of Orson in Sweden. The town, says the *Lumbermen's Review*, is probably the only municipality in the world which has ordinary city expenses, but which imposes no taxes upon its citizens. Moreover, the local railway is free to every citizen, and there is no charge for telephone service, schools, libraries and the like. This happy state of affairs is due to the wisdom of a former generation of citizens and rulers of Orson, who planted trees on all available ground. During the last thirty years the town authorities have sold no less than \$5,000,000 worth of young trees and timber, and judicious replantings have provided for a similar income in the future.



Biltmore Winter Term

The members of the Biltmore Forest School sailed October 4 for Germany, where they will make their winter quarters at Darmstadt.



China May Send Us Students of Forestry

A dispatch to the *New York Herald* from Peking says that Major Ahearn, chief of the Philippine Bureau of Forestry, who is now touring in China, conferred with a number of government and provincial officials recently concerning the needs of China for afforestation. The interest which he aroused indicated that in all probability a number of students will soon be sent to American forest schools.

Resolutions of Minnesota Citizens

A mass meeting of citizens at Hibbing, Minn., adopted on October 14 the following resolutions on the forest fire situation: "Whereas, the timbered portions of the state of Minnesota have at intervals for the past several years been visited by disastrous forest fires, the most extensive being the fire in 1893, which destroyed the village of Hinckley and devastated the surrounding country, resulting in the loss of 416 human lives and property of untold value; the fire which destroyed the village of Virginia, in this county, in the same year, resulting in a great loss of property, but fortunately no loss of life; the fire which destroyed the village of Chisholm in this county in 1908,

and laid waste a territory that was almost an empire in extent, entailing a property loss of several millions of dollars; and the recent deplorable fires in the northern counties of the state, which have resulted in the loss of so many lives and property of almost stupendous value and left a multitude of people homeless and penniless, all of which occurred directly at a result of forest fires, not mentioning the numerous small fires which were not sufficiently disastrous to attract public attention, and

"Whereas, said fires have almost without exception originated upon cut-over lands, from which the timber had been removed six or seven years previously thereto, and such fires destroyed not only the farm buildings of the thrifty homesteader and the homes of the artisan and toiler, which represented a life-time of honest toil, and also destroyed marketable timber, the value of which was so great that it cannot even be estimated, but in addition thereto they destroyed the young growing timber, which in a few years would be of sufficient size to be marketable, and which should have been conserved for future generations as their legitimate heritage, and

"Whereas, we believe that the recurrence of such fires may be prevented and the danger to life and property therefrom be almost wholly removed, and

"Whereas, the state of Minnesota in the largest single owner of timber holdings within its borders and has through such fires lost property of such value that the actual cost of an intelligent and effective system for the prevention of such fires appears infinitesimal in comparison therewith, and

"Whereas, in the Scandinavian peninsula, Germany and numerous other foreign countries, systems are in vogue and working admirably for the prevention of such fires, and we have enough confidence and pride in the people of our own state to believe that what foreign nations have done successfully we can do successfully, in view of the foregoing.

"Be it resolved, that we urgently request the legislative and executive departments of the state to take such steps at their earliest convenience as will, so far as possible, prevent the further needless loss of life and property from that source in the timbered portions of our state, and to that end we humbly suggest that a sufficient and effective patrol system be inaugurated by the state, say of one patrolman to every six square miles of territory, whose duty it shall be to, as far as possible, prevent forest fires and to discover and extinguish them at their outset, without waiting until they have developed into a raging conflagration."

American Shippers Criticized

In an editorial entitled "American Methods," the *Timber News*, of London, England,

has stirred up something of a hornets' nest among the lumber journals of the United States. The burden of the article is the statement that "British timber agents and importers have on many occasions good cause to declare that they have been swindled out of their money by certain lumber shippers in various American ports, timber often being sent (and for which shippers have drawn the money before it has been received on this side) which on arrival has turned out to be of a very low grade, and far from what the shipper, according to his contract, ought to have supplied." An instance is quoted of a Hamburg firm which has taken civil and criminal proceedings against two New Orleans lumber companies, and already been awarded £5,000 damages in the civil case. It looks as though the *Timber News* had been a little hasty in taking up arms, but from the result of this particular case, and from the haste and energy with which several of the United States journals have criticized the London journal for its article, it would also appear that the shoe pinches in spots. Whatever the facts may be, the result will be beneficial, as too much publicity cannot be given to the few unscrupulous members of the trade whose methods may have far-reaching evil effects. The fact that the defendants in the civil suit had to pay \$25,000 for the liberties they took with their customers in Hamburg, is a strong indication that the laws and customs of the United States, if rigidly enforced, are quite sufficient to protect foreign purchasers.—*Exchange*.

Idaho Understands Conservation

The Potlatch Lumber Company recently applied to the state of Idaho to purchase outright 24,000 acres of state lands, on which the company already owns the timber under a twenty-year contract. Their application has been approved by the state.

The attitude of the state of Idaho is to be commended for the position it has taken on this question. From every standpoint, their reasoning is sound. To compel the Potlatch Lumber Company to strip the timber from the land, irrespective of market conditions, would have been simply preposterous and invited criminal waste. The lumber company had prepared itself to denude the land within the time specified in its twenty-year contract with the state, so it was fortified to meet its obligations. Slowly the idea is gaining ground that true conservation means the most complete utilization of any product. For every foot of lumber cut a profit should be realized to help develop other industries after the timber is denuded. To merely slaughter the timber, irrespective of the needs of trade, is essentially wrong. Lumbermen everywhere were deeply interested in the outcome of this question, as it means the market will not be glutted and gorged with a tre-

mendous output, which would weaken and disturb trade generally, without accomplishing any good to any one, and least of all to the state of Idaho.—*Timberman.*

Farm Forests of Virginia

One of the results of a recent study of forest conditions in Virginia, made by the state in cooperation with the Forest Service is the publication of a report on "The Farm Forests of Virginia," by W. W. Ashe, of the Forest Service. This report is printed by the state of Virginia.

After reviewing the general forest situation in Virginia, and showing that the state must ultimately face the problem of producing wood for home consumption, since her neighbors are not prepared to raise surplus timber, Mr. Ashe takes up the possibilities offered in the state for successful woodlot management on the farms. In many respects, he points out, the farmer is in a better position to make his forests profitable than is the owner of large tracts. "Low-grade timber in many sections has only a nominal value, on account of the lack of extensive nearby markets. In this respect, the farmer is advantageously situated, since he has a constant though limited demand on his farm for low-grade wood for fuel and for ordinary buildings, and can save his best timber for the market.

"Forest fires endanger young growth, and fire protection is costly to the individual and difficult to put into effect. In the case of the farm forests, most of the forest land is isolated in bodies separated by fields, and this danger is much reduced. In the western counties, however, where the forest lands of many owners who have their farms in the

valleys lie together on the mountains, protection from fire becomes the most important problem, on account of the great difficulty of preventing and extinguishing the fires and the enormous damage done by them to young timber. This difficulty can be met by cooperation among landowners to secure wardens and patrols, and by obtaining more effective forest fire legislation.

* * * * *

"While the farmer cannot become a forester, he can acquire the general principles of managing timberlands. On account of his own need for fuel and for low-grade timber, and in addition frequently a nearby town market as well, he can use the tops of trees and small and defective trees. He can increase the yield and improve the quality of timber in a stand by thinnings; he can carry on improvement cuttings to remove dead, defective, and low-grade trees; he can cut so as to determine or affect the character of the young growth; he can plant small openings with seedlings of desirable species."

The report then describes the character of the three types of forests that are found in the Tidewater region, the Piedmont region, and the Mountain region, respectively, and takes up the ways and means of increasing the value of the farm forests.

"The most important problem in connection with the conservation of the present farm forests and the maintenance of an abundant and cheap supply of timber for future domestic use are:

"1. Protection of the forests, especially of the second growth, from fire.

"2. Development and maintenance of farm forests.

"3. The use of idle and waste lands by forest planting.

"4. Education in forestry for farmers."



STATE FORESTRY ORGANIZATIONS

A list of state forestry associations and their secretaries is printed below. Corrections in this list will be carefully recorded by AMERICAN FORESTRY.

Name of organization	Secretary	Address
Appalachian Mountain Club.....	R. B. Lawrence.....	Tremont Bldg., Boston.
Arizona—Salt River Valley Water Users' Association.	Charles A. van der Veer..	Phoenix.
California—Water and Forest Association...	I. C. Friedlander.....	1405 The Merchants Exchange Bldg., San Francisco.
Forestry Educational Association.....	E. C. Damon.....	San Diego.
Sierra Club.....	William E. Colby.....	San Francisco.
Pacific Coast Forest, Fish and Game Association.	Wm. Greer Harrison...	San Francisco.
Tri-counties Reforestation Committee.....	Miss L. A. Finch.....	Riverside.
Colorado Forestry Association.....	Ellsworth Bethel.....	Denver.
Connecticut Forestry Association.....	F. H. Stadtmüller.....	Elmwood.
Georgia Forestry Association.....	Alfred Akerman.....	Athens.
Indiana Forestry Association.....		(organization not yet complete).
Iowa Park and Forestry Association.....	Welsey Greene.....	Des Moines.
Louisiana Forestry Association.....	Mrs. A. B. Avery.....	Augusta, 254 Stoner Avenue, Sheveport.
Maine Forestry Association.....	Edgar E. Ring.....	Augusta.
Massachusetts Forestry Association.....	Irving T. Guild.....	4 Joy St., Boston.
Michigan Forest Association.....	H. G. Stevens.....	25 Band Chambers, Detroit.
Minnesota State Forest Association.....	E. G. Cheyney.....	St. Anthony Park.
Nebraska Park and Forestry Association...	Miss Leila B. Craig....	York.
New England Forest, Fish and Game Association.	Arthur T. Harris.....	16 State St., Boston.
New Hampshire—Society for the Protection of New Hampshire Forests.	Allen Hollis.....	Concord, N. H.
New York—American Forest Preservation Society.	Geo. Milroy Bailey.....	Corfu, N. Y.
Forestry, Water Storage and Manufacturing Association of the State of New York.	Chester W. Lyman.....	1 Broadway, New York.
Northern New York Forestry Association..	O. B. Trappan, Director.	Potsdam, N. Y.
State of New York Fish, Game and Forest League.	L. C. Andrews.....	Elmira.
The Association for the Protection of the Adirondacks.	Edward Hagaman Hall.	Tribune Bldg., New York City.
North Dakota State Sylvaton Society.....	Miss Ella J. Mitchell...	Penn.
Ohio—Cincinnati Forest and Improvement Association.	Adolph Leue.....	127 West Twelfth St., Cincinnati.
Ohio State Forestry Society.....	Prof. J. J. Crumley....	Wooster.
Oregon Conservation Association.....	A. B. Wastell.....	904 Lewis Bldg., Portland.
Pennsylvania—Franklin Forestry Society...	W. G. Bowers.....	Chambersburg.
Pennsylvania Forest Association.....	F. L. Bitler.....	1012 Walnut St., Philadelphia.
Vermont Forestry Association.....	Ernest Hitchcock.....	Pittsford.
Washington Conservation Association.....	Clarence H. Bailey.....	P. O. Box 236, Seattle.
West Virginia Forestry Association.....	A. W. Nolan.....	Morgantown.

An Important Notice

TO MEMBERS OF THE AMERICAN FORESTRY ASSOCIATION

Members of the American Forestry Association have been informed through this magazine of the new arrangement by which membership in the Association does not include the magazine as heretofore. The dues for annual membership were accordingly made one dollar instead of two dollars at the last annual meeting, the subscription to the magazine being two dollars. This arrangement was made necessary by a ruling of the Post-office Department in regard to rights of entry for AMERICAN FORESTRY as second-class mail matter. The new arrangement has been in operation during the year 1910 as regards new members, but did not affect those who had already received their bills for 1910 under the old plan. There are these options under the new plan. Membership with or without subscription to AMERICAN FORESTRY, or subscription to AMERICAN FORESTRY with or without membership in the Association.

We earnestly hope all of our members will retain both membership and subscription. The former will maintain their connection with a great movement which is constantly gaining in importance. The latter will give them their money's worth. AMERICAN FORESTRY has entered upon the most useful period of its career. Its work is well defined, its position is generally recognized, and it commands the best work of the authorities on forestry. It occupies its field alone and it is one of the magazines of authority that the man or woman who wishes to be well informed on public questions cannot afford not to read.

IMPORTANT BOOKS ON FORESTRY

PRINCIPLES AND PRACTICE OF FORESTRY

FOREST MENSURATION. By HENRY SOLON GRAVES, M.A. A complete text book of this important subject and the first written for American Foresters. It deals with the determination of the volume of log, tree, or stand, and with the study of increments and yields. Price, \$4.00

ECONOMICS OF FORESTRY, THE. By B. E. FERNOW. This volume treats of forests and forestry from the standpoint of political economy, and is designed to furnish a trustworthy basis for formulating public policy. Price, \$1.50

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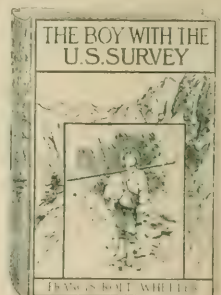
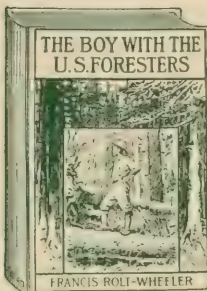
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EDUCATIONAL DEPARTMENT.—Series of educational and general bulletins and leaflets will be issued at intervals. These will be sent to all members and will be provided for distribution at a nominal cost. The first numbers of the general series are a brief summary of the history and need of the project for National Forests in the southern Appalachian and White mountains; the record of the vote on the Weeks bill, looking to that end, in the Sixtieth Congress; and a part of the argument for the Appalachian forests by the President of the Association, Hon. Curtis Guild, Jr., in his annual address for 1910.

LECTURE SERVICE.—It is proposed to establish a lecture service through which reliable lecturers upon forestry subjects may be obtained. This bureau will arrange with able lecturers at central points who will be available for lectures, with illustrations if desired, before clubs, associations, boards of trade, or general audiences.

CORRESPONDENCE BUREAU.—Through this bureau the Association will furnish information on forestry when possible and provide advocates of the cause with material.

LEGISLATION DEPARTMENT.—As it has always done, the Association will use the agencies at its command to secure the passage of wise legislation in furtherance of its great purpose. Its national character and the location of its main office in Washington enable it to keep in close touch with national legislation and it will cooperate, when practicable, with forestry workers in the several states to promote good state legislation. Its first and most important object in legislation is the passage of a measure for the creation of National Forests, with especial reference to the southern Appalachian and White mountains.

The development of these lines of work to their highest usefulness requires the maintenance of a considerable staff and an expensive plant. Contributions for the work, or for any particular phase of it, are always welcome. The income of the Association by which its general work is supported is derived from membership fees, which are as follows: **Annual members, one dollar yearly; contributing members, ten dollars yearly; sustaining members, twenty-five dollars yearly; life members, one hundred dollars, and patron members, one thousand dollars**, the two latter being exempt from further payments.

All members are entitled to all the rights and privileges of the Association. They receive all ordinary publications. Subscription to **AMERICAN FORESTRY** is extra. The price is **two dollars** a year.

The office is at 1410 H Street N. W., Washington, D. C.

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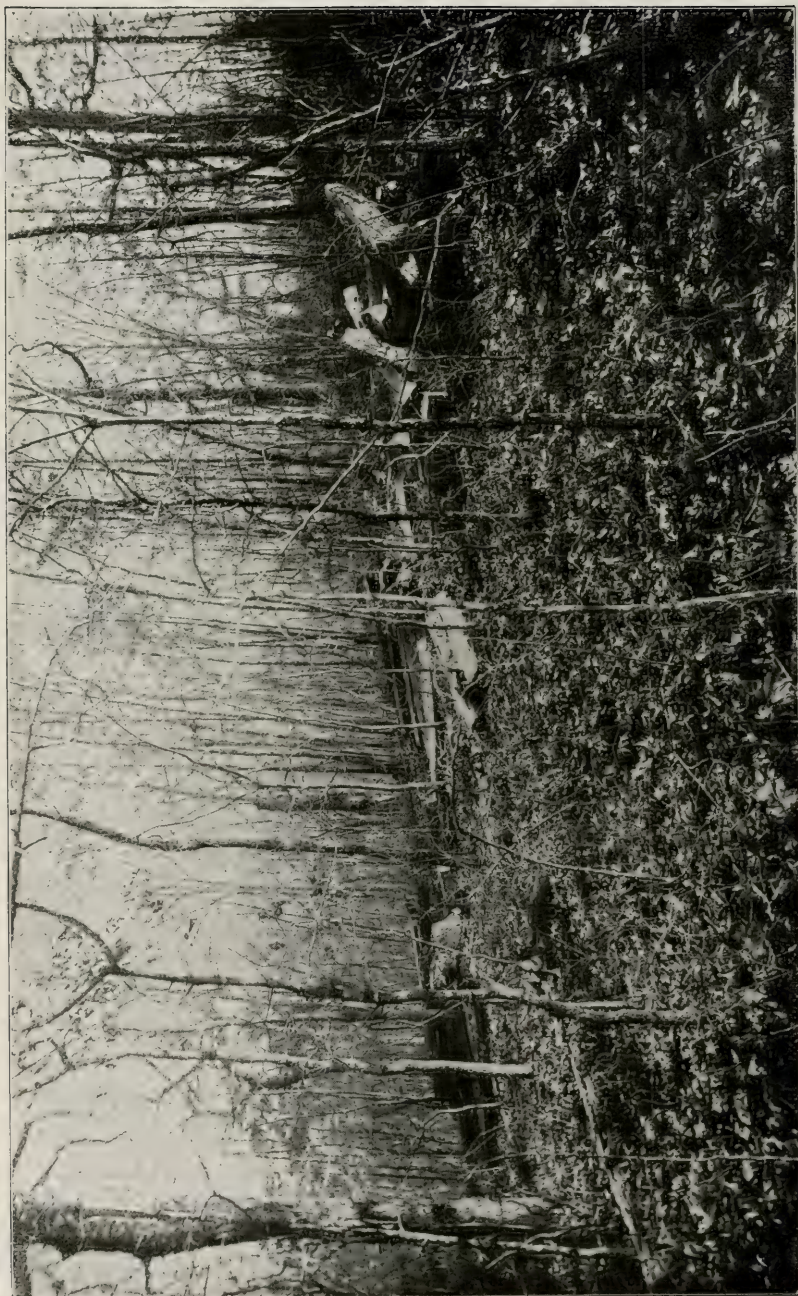
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Dear Sir: I hereby signify my desire to become a member of the American Forestry Association. One dollar (\$1.00) for annual dues is enclosed herewith.

Very truly yours,

Name _____

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CONSERVATIVE LOGGING IN THE SOUTHERN APPALACHIANS

A large oak at Biltmore cut and made into cord wood without injuring surrounding small growth

American Forestry

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No. 12

LOGGING FOR PULP WOOD IN THE SOUTHERN APPALACHIANS

By GUY CARLETON HAWKINS

DO YOU know where the paper came from which is before you?

Of course, it came from Washington, D. C. But that is neither the beginning nor the end of its life story. The publisher received the paper from the paper mill; the paper mill received its pulp and fiber from the pulp mill, and the pulp mill took the wood from the forest to make the pulp.

From what forest?

It came, perhaps, from the forests of the Southern Appalachians, those beautiful hills and valleys which are fast becoming treeless wastes.

Are you interested to know how the forest is made into AMERICAN FORESTRY?

Let us fly by means of a mental airship to the top of one of those long, broken crests of the Blue Ridge Mountains known as the "Balsams." Looking down the mountain-side, we see that denuded tract described to us again and again by those who would protect the forest. At our back is the magnificent stand of balsams and spruce towering high into the air, while here and there in an open space is a a twisted, gnarly hardwood.

The axmen with their saw and ax are at work near by, and at their warning cry of "Timber!" a gigantic balsam cracks, sways, and then sweeps to the

ground with a mighty crash and is still again, among the tangle of rhododendrons and fallen tree-tops. Soon the tree is stripped of branches, dissected into twenty-five-foot lengths, and our "paper" is on its way to the mill. Even now we see the slow-moving bodies of the oxen come crawling up the trail. With some difficulty, the driver gets the team beside a log; the chain is hooked on and down they go along the winding trail until they come to the so-called log-string.

Let us follow and watch the string of ten logs, averaging twelve inches in diameter, "dogged - and - chained" together. We must now wait a few minutes for the four-ox team which is to "snake" or "skid" the string of logs out, so let us look about us.

It is the end of June, and everywhere the huge clusters of pink, red, and white rhododendron blossoms are to be seen. But that is not all. On every side is the unsightly path which the axmen leave behind them. Brush, dry tops, and slash of every description is strewn or piled about the rhododendrons, waiting for that fatal day when the forest fire in a cloud of smoke comes sweeping up the mountain. Then, here and there we see the crooked or leaning yellow birch or silver bell waiting to be blackened on that same day.



LOGGING FOR PULP WOOD IN THE SOUTHERN APPALACHIANS

Bringing in a string of logs

Crack! Like a pistol shot, the driver's whip brings us back with a snap to the ox-team coming for the logs. A few minutes—another crack of the whip, at which every beast leans into the yoke, and our "paper" is on its way again. The trail down which we follow the logs is a gully three or four feet deep, partly dug and partly worn into the ground; and in the bottom of it is a little stream of water which makes a slippery mud over which the logs glide easily. A walk of three-quarters of a mile brings us to the log yard, where the logs are cut up into billets. Two at a time, the string is finally brought to the pile and the cattle amble off after another load.

The logs are now ready to be sawn and split up into five-foot billets preparatory to being shot down the pole-chute to the creek below. On a rainy day, when the chute is wet, a hundred-pound billet will shoot down a forty-per-cent grade at the rate of a mile a minute, leaping from the end of the chute far out into space and striking the stony creek-bed only three or four

times before it comes to rest a thousand feet below. A stirring scene it is to watch these billets jump from the chute, crash on the ledge below, and leap again, until finally they lie quiet in the pile, just above the so-called "wet-chute," far below.

But come! the splash dam is about to be opened, and we must be on hand. Away up on the side of the mountain man has constructed a dam, behind which he holds a little pond of water. For a day and a night the water from a tiny brook has been collecting. A chute from the top of the mountain brings billets directly into the quiet pool and those from another chute are run into the creek just below the dam. As we stand watching, of a sudden the gate is loosened, flying up, and out pours the water, carrying the billets down the steep mountain-side in a whirling, dashing mass. Oftentimes the billets are broken and split, but no damage is done, for when they reach the mill they will be cut to bits. But let us go back to the dam and see how it was constructed. Though only fifty feet

across and twenty high, it yet takes twenty-four hours to fill it from the little stream coming down the mountain. On the inside, the planks slant toward the slope at an angle of forty-five degrees to give the structure strength; it is fifteen feet through at the base and only the width of a log on top. The gate, which swings from the top, is only six feet square, and yet all the water which has been collecting for the last twenty-four hours rushes through in less than two minutes.

Following along down the creek-bed, slipping and sliding much of the way, we come to the huge, widespread pile of billets, and, farther on, to the wet-chute. Here six men are hard at work throwing the billets into the chute. This chute is made of smooth planks, forming a V-shaped, nearly water-tight trough, into which the water of the creek is turned. The water rushes down, carrying with it the billets which the workmen are throwing in. They must work as fast as possible, for the water will soon be dammed back for another splash.

After admiring the work of the little stream for a few minutes, we pass along down to the main creek of the valley. Here work begins to take on a more civilized aspect. A narrow-gauge railroad has been built along beside the creek in the valley, and there is the little engine waiting for the eight or ten cars to be loaded with the billets. Between the track and the chute is the big pile of billets brought down by the water.

To follow the wood to the mill and watch it go through the various processes, from the shattering of the billets to the rolling of the white fiber into thick sheets, would take us another long



LOGGING FOR PULP WOOD IN SOUTHERN APPALACHIANS

Typical pole chute, down which the billets come from the slope above

day; so let us go up the mountain again, to see the Lumber Jack in camp.

Up, up, up the winding trail we climb, until at last we reach the crown of the ridge, which is the timber line as well, for the other side has not been logged as yet. The long climb will have its reward for us if we but go up a neighboring knob to rest, with all the world below us. In the distance, ridge after ridge rolls into sight, and at first



LOGGING FOR PULP WOOD IN SOUTHERN APPALACHIANS
A spruce billet leaping from chute at the rate of a mile a minute



LOGGING FOR PULP WOOD IN SOUTHERN APPALACHIANS
The camp in the clearing

the magnitude of it all carries us away with a burst of exultation; then a sense of our insignificance takes its place, bringing our thoughts to the smaller of nature's charms. Who does not love the quiet path, the singing of the happy working birds, the rippling laughter of the creek that runs along as if the whole world depended upon its swiftness? Who does not care to stroll among the tall, straight trees and over the soft mosses, as did our forefathers of long ago? And now, as we stand here, we have them all before us. Far down in the deep valley the creek winds between the steep hillsides, carrying, little by little, a pebble or grain of sand on towards the ocean. From the creek to the blue ridges among the clouds, under those broad green shields, we find the playground for all our true American children. Do we want this great play-ground, or do we want the barren waste on the opposite side of the ridge?

But we have climbed the mountain to see the lumber camp, so let us find it. Five minutes' walk down into the standing trees of the slope brings us to a clearing, and it is here that the camp is located. You may ask why the camp is so far from the center of activities. It is principally to prevent destruction by the fires which the woodsman knows are soon to sweep up the logged mountain-side. The woodsman also knows that unless the season is extremely dry the standing spruce and balsam are as fireproof as is a slated roof, and consequently we find his camp in their midst.



LOGGING FOR PULP WOOD IN SOUTHERN APPALACHIANS

Small splash dam just after opening the gate

It is nearly sundown, and the workmen are coming in from the different points of the operations to the coarse supper prepared for them. The log cabin in which they live is strongly constructed, and although rather dark and rough inside, affords proper protection from the weather. A short distance from the cabin is the cattle-shed, where we find our four-footed friends quietly munching their meal, with now and then



LOGGING FOR PULP WOOD IN SOUTHERN APPALACHIANS

The creek dashing down the mountain side, carrying
with it a multitude of billets

a stamp of the foot or switch of the tail to keep the flies at a respectful distance. A couple of black "porkers" are still hunting for a last dainty morsel before "turning in" for the night.

After we have satisfied our curiosity, the camp boss comes out and is quite willing to have a chat with us. Among

other things, he tells us that it costs \$8 per cord to cut and deliver the wood to the pulp mill.

Does that mean anything to us? Eight dollars per cord, and nearly all of it for transportation. The mill must have wood, and next year the railroad is extended farther into the mountains and the cost will increase, so that every balsam and spruce must be cut to pay for the extra expense. It is not necessary to say that the price of paper must rise in a parallel line with the cost of production. Shall we be ready to pay those prices, or shall we cry out as we recently did at the high price of meat? Should we not be willing to pay a few cents more for our paper at present, so that the lumberman in the forest could practice a little conservative forestry? It is the same with the hardwoods which are being cut for lumber. If we would have them conserved we must pay the lumberman for conserving them. We could easily pay a few cents more per thousand feet today to prevent an increase amounting to dollars in the future. And so if we wish to have conservative forestry practiced we must pay for it, as we must pay for all things which are good.

Having learned our lesson for the day, we stroll up to the knob on the ridge once more and there, as the sun drops slowly behind the distant Smoky Mountain, we watch night fall over the Hetch-Hetchy Valley of the Appalachians.

THE FOREST PARKS OF NEW YORK

By JOHN S. KENNEDY

Secretary, Public Service Commission, Second District, Albany, N. Y.

THERE is no section of country in all the world with more beautiful forests than the populous State of New York. To the thoughtless observer it may seem strange that, with its great and apparently closely settled population, it takes the lead of all the States in acreage of state-owned forest preserves, but such is the fact; and it is now the established policy of the State to constantly increase its acreage.

In the early days there was no section of the United States that contained a more dense, evenly distributed, or valuable forest than that within what is now the State of New York. In fact, New York State was the home of the lumberman, and saw the beginning of actual lumbering in the United States. Like all the States in the Union, like all countries where civilized man has dwelt for any length of time, the destruction of the forests by lumbering and other means has gone too far, and evil results therefrom begin to appear and make themselves felt.

As New York was the first State where lumbering was done on a large scale, so it was the first State to take positive and active means to stop the timber waste; to manage, control, and replenish the forest growth. The question was discussed during the time of Governor DeWitt Clinton, but the first move was in 1872, when Governor Horatio Seymour secured an appropriation from the legislature for making a forest survey.

The Adirondacks at that time were an unbroken wilderness, and the bear, the elk, the moose, and the wolf roamed about with little fear of interruption. The real beginning, however, was made by the enactment of a law, in 1865,

providing for a commission to supervise the forest regions. From that time much reclaiming work was done, many experiments in tree garden work made, and a considerable amount of wild forest land acquired by the State in the Adirondack and Catskill Mountain regions for a State Forest Preserve and some of the waste land planted to trees.

By statute, in 1892, confirmed by the Constitution in 1895, a park was established in both regions, composed of certain lands in sixteen counties. In the Constitution the State has laid down its established policy providing that "The lands of the State, now owned or hereafter acquired, constituting the Forest Preserves as now fixed by law, shall be forever kept as wild forest lands. They shall not be leased, sold, or exchanged, or be taken by any corporation, public or private, nor shall the timber thereon be sold, removed, or destroyed."

The first years of State regulation were not very effective. True, great tracts of land were acquired, but no intelligent effort was made to bring the importance of the forest in all its bearings to the attention of the general public or to induce lumbermen when cutting to leave some reasonable forest covering on the hillsides and mountain tops, or to leave seed trees of the cone-bearing species at short intervals to promote natural re-seeding. No consideration was given to the diminishing water supply or to the cause of its diminution. Little care was used to protect the forests from ravages by fire.

It is true that a firewarden system was established and fairly good work done, yet year after year many thous-

and dollars' worth of valuable timber, and even the more valuable soil itself, was destroyed. Lumbermen, speculators, and dishonest men robbed the State of its timber, and through any and many pretenses wantonly took and used much of the State's forests with little or no thought except to get as many dollars out of it for today as they could. They left the unused parts of trees, logs, limbs, and tops where they fell, forming a dangerous fire trap, which thus created additional danger to all the forest growth left uncut. Great fires raged through the cuttings and swept the *débris* up in mighty conflagration destroying everything in its path, standing trees as well as down timber. The railroads, by careless management of their locomotive engines and rights of way, added to the danger and destruction.

During the administration of the late Governor Higgins, in 1905-6, and continued under Governor Hughes, the matter of the preservation of the Forest Preserve was taken hold of with a firm hand and the mandates of the Constitution strictly carried out. Trespassers and timber thieves were prosecuted and punished, tree planting has been carried on and encouraged among the people.

Concededly the greatest agency of destruction to the forest was the coal burning locomotive, which in its ever onward rush through the country, scatters destructive coals and sparks along and upon, and even outside, the railroad right of way.

Acting on the petition of the Forest, Fish, and Game Commission the powerful Public Service Commission this year ordered the installation of oil burning engines on the lines of the New York Central and the Delaware and Hudson, operating through the Forest Preserve, and the order has been obeyed. The success of this move is best attested by the statement that while in other parts of the country, this year has been one of the worst for forest fires, there has not been one fire of any great consequence in New York State.

This extreme action on the part of New York State followed the great devastation of the season of 1908, when 368,072 acres of wooded land in the Forest Preserve were burned over, villages destroyed, and the property loss and suffering of inhabitants of the district affected most serious.

The lesson of 1903, when 465,000 acres were burned over and a loss of \$3,500,000 incurred, had not proved a warning and was so soon forgotten that in 1908 the railroads, as well as the State, found themselves practically unprepared for the prevention of fire damage. The 1908 fires in the Adirondacks destroyed lumber and logs to the amount of \$126,539, and buildings, the value of which was \$44,395, besides the loss to State lands amounting to \$644,000.

On thousands of acres which were first burned in 1903, the 1908 fires consumed the vegetable matter, or "duff," which forms the floor of the forest, and the destruction of which will prevent reforestation for many years. The Long Lake West fire, conceded to be a railroad fire, was one of the most disastrous in the history of this region. In places the soil burned down to the rocks. The hamlet was wiped off the map, and even the railroad station and cars standing on the tracks were burned.

In addition to the order made by the Public Service Commission safeguarding from railroad-set fires, a comprehensive system under the Forest, Fish and Game Commission is observed over the entire Forest Reserve. A complete fire patrol is maintained. Observation stations have been erected on twelve mountain tops. From each a territory within a radius of twenty miles can be clearly observed through the aid of powerful field glasses. The man in charge is provided with a map of the territory, a range-finder, a telephone, and field glasses.

Every fire patrolman is within telephone communication of each observation station. The observation station attendant sees a smoke curling up ten

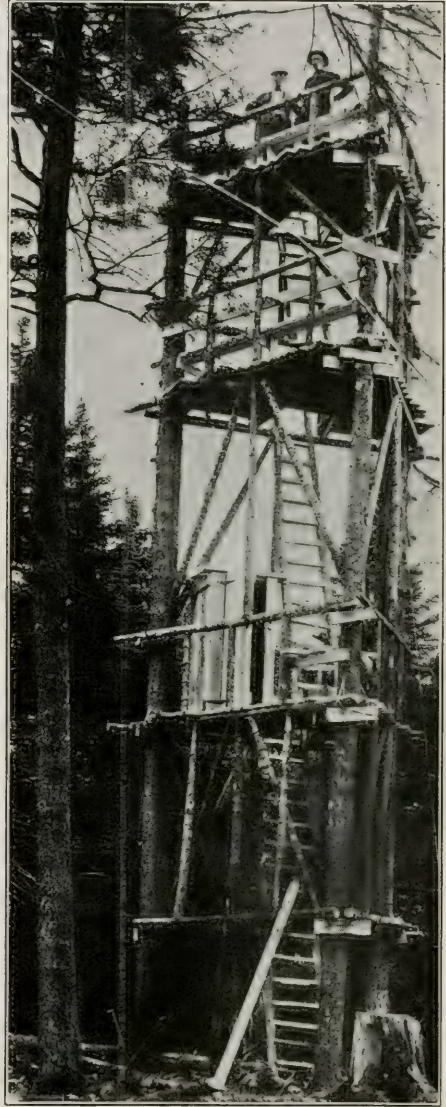
miles away; he locates it by his map and range-finder, telephones the nearest patrolman, and in a few minutes men are at the place to extinguish the fire. More than two hundred fires started last season, and yet under this system, they were extinguished quickly and with little or no resulting damage.

One hundred miles of telephone line within the forest has been constructed and acquired by the Commission, connecting nearly all the more dangerous sections and facilitating the work of forest protection. The patrolmen, supervisors of towns, and the people generally have entered into the spirit of the work. Nearly all persons going into the woods have been especially warned to be careful about building fires and thoroughly instructed how to start camp fires, particularly as regards their extinguishment.

Today, twenty-five hundred square miles, or 1,641,523 acres comprise the State's own preserve which is valued at nearly half a billion dollars; and fully two-thirds as much more acreage and value estimated at one hundred millions, is owned by corporations and individuals. The total acreage of all the other State forest preserves in the country is but 2,837,605 acres. The Adirondack preserve contains 1,530,559 acres; a gigantic plot of never ceasing delight, bewildering in its scenery, indescribably bracing in its air, abounding in mountain, forest, and stream; and wood trails of surpassing beauty. Its yearly visitors number a half million souls.

The Catskill preserve has 110,964 acres; a fairyland of wooded delight, rich in historical relations—where Rip Van Winkle slept his wondrous sleep—and is located but a few hours run from New York City. Its health restoring hills and dales have won world-wide fame.

In accordance with the wishes of the late Edward W. Harriman, his widow, Mary W. Harriman, has offered, and the State has this year accepted, a tract of about ten thousand acres of land situated in Orange and Rockland counties, to be held in perpe-



Lookout Tower on Hunter Mountain

tuity as a State Park; and in furtherance of the same object to give to the State, or to such board or commission as may be authorized to receive and administer the trust, the sum of one million dollars. Mrs. Harriman stated that it was her husband's wish, and it is her expectation, that this fund should be used by the State to acquire other parcels of land adjacent to the above-mentioned tract and intervening between it and the Hudson river, and



Observation Station on Summit of White Face Mountain. Altitude, 4872 Feet

in the improvement of the whole, so that the park may ultimately have some portion of river front and thus by improved accessibility be rendered more useful and more beneficial to the people of New York City and the neighboring counties.

In addition to the munificent Harriman gift, the Palisades Park Commission, acting with a similar New Jersey Commission is preserving and protecting the scenic beauty of the mountain lands known as the Palisades, along the west bank of the Hudson river. Already private contributions of land and money, amounting to \$300,000 have been received from individuals, and \$400,000 contributed by the State of New York, and \$50,000 by the State

of New Jersey, to carry on the work.

The third great park, known as Highland Park, consisting of the Harriman gift and Palisades lands, will extend from Fort Lee to Newburgh along the shores of the picturesque Hudson and back into a country full of scenic beauty and historic lore. Private subscriptions, amounting to \$1,625,000 have been received from seventeen individuals, in addition to the Harriman gift, to develop this park. The list was headed by John D. Rockefeller and J. Pierpont Morgan, for a half million each. This gift is to be supplemented by an appropriation by the State of New York of another quarter of a million.

With these three great state preserves, surely New York can challenge the whole world to produce within an equal area such glories of nature so carefully preserved. The Association for the Protection of the Adirondacks, organized in 1901, has been a potent force in the conservation of New York State's wealth of forest possessions. The president, Hon. Henry E. Howland, Vice-President John G. Agar, and Secretary Edward Hagaman Hall, as well as its officers in general, have given much of their time, study, and means in every effort tending toward the preservation of the State's forests.

There can be no argument but that this large outlay of money and effort on the part of the State is fully justified by the results. The efforts being made in New York State are attracting the attention of the entire country, and can not fail to prove a powerful stimulus to forest conservation.



MANAGEMENT OF CUT-OVER LANDS

By GEORGE H. EMERSON,

of the Northwestern Lumber Company, Hoquiam, Washington

(This address was delivered by Col. Emerson at a meeting of the Washington State Commission on Forest Legislation in Seattle, October 8. As sane conservation doctrine by a practical lumberman, and as an answer to the self-interested ideas of certain large timber owners in California, referred to in the last number of this magazine, it deserves wide reading.—Ed.)

CHOPPINGS differ in different parts of this state. East of the mountains our pine grows with little or no underbrush, and when the trees are cut there is no doubt but what the tops should be limbed, piled in openings and burned, leaving the ground clear to reproduce timber, or grass, or both. West of the mountains all is different, and it is respecting west of the mountains I write. Here choppings divide into those where the ground is suited to agriculture and those where it is valuable only for timber. It is to choppings on land valuable only for timber that I wish to confine your attention. The greater portion of our choppings come under this head—a much larger portion than is commonly thought

It has been the custom of the American people to burn their choppings. Beginning with the landing of the Pilgrims the fires have never been out when the weather permitted the choppings to burn. In all things Americans have looked for quick returns, always ready to discard or destroy all that could not be turned immediately to their use, or sold at a profit.

It is said, by those who know, that more natural gas is going to waste than would furnish fuel for all purposes if utilized, gas that has been tapped when drilling for oil and discarded when not oil; that more coal is destroyed by mining the lower high grade strata, and allowing all above to fall and mix with dirt, than is at present used. Cattle were once killed for hides, buffalo

for robes, elks for horns and teeth, deer for pelts, and forests were burned for hunting ground, but in nothing has this waste been more marked than in the use of our soil.

As a nation we have cropped with little attempt to conserve or replace that which we have taken from the farm. The result is shown in the older parts of our country. Farms are abandoned because exhausted; their values have steadily declined and their owners have drifted to apply the same methods to new lands and on these new lands they return nothing to the soil, and soon are reduced to twelve bushels of wheat where they once raised twice that amount, and where countries tilled a thousand years, by careful methods, harvest three times that much.

All timber lands have accumulated leaf mold that if saved and mixed with the subsoil would render it productive, but this mold is combustible when dry, and from Maine to the Pacific it has been burned, because of the easy method of reaching the ground—the old process of killing for hides, horns and teeth. If our settlers could carefully save the forest soil they now burn, or clear their lands without destroying it, they would make a great stride in conservation.

It is so easy to burn a chopping and see that which is not wanted drift away in smoke; so handy after the heads are removed from the grain to have the fire clear the stubble for the plow; so nice when one wants a new home to burn up the old one, instead of

the slow process of pulling it down and saving the material.

Here in the west the ground where our timber grows is covered to the depth of several feet with mold and moss, decayed timber and fallen tree trunks that have lost out in their struggle to reach sunlight. Over all and beneath our big trees the brush is thick and many little trees are struggling for life. Then comes the timber faller, and the tops and limbs of our big fir, cedar and spruce are piled on the cover and help protect the ground, in the chopping, from the sun.

Many low grade and young trees and hemlock are left standing. An old chopping has a timber land appearance in some parts, for what we do is not to cut all but only that adapted to our present market. Our process is the selection of the fittest—the keynote of American forestry. Now keep out fire and we become true conservationists, for some day we will again return for the fittest and later for the best of the new crop and thus perpetuate our forests.

Those long familiar with western lumber conditions will remember the time when we had only a coastwise market, with an occasional foreign order, and no thought of ever shipping by rail. They will remember all coastwise cargoes were tallied and graded at destination and the grades were merchantable, refuse and firewood.

Firewood returned freight only; refuse returned freight and cost to saw; merchantable, which included all we now call select and most of the clear, brought freight, cost to saw and cost of the log. Any profit had to come from the little flooring we made or some special order.

When lumber could be had for such prices customers wanted only the best, so the dealers wanted only the best, and the mills wanted only the best logs, and the loggers could use only the best of the best trees. For such logs the mill paid four dollars to four dollars and fifty cents a thousand feet. Anything falling below their standard received four notches, which meant "Not

scaled but taken by the mill for full measure." To repeat, the buyer demanded the best and that the dealer must furnish or go to the wall. The logger must furnish what the mill wanted or go to the wall.

Up to 1897 fir logs had seldom sold for more than \$4.50 and stumpage had seldom been higher than 50 cents a thousand. The best quarter section of timber, under those conditions, cut less than 6,000,000 feet. Six million was the limit, as 12,000,000 to 14,000,000 is the limit to-day. We must then have left the other 6,000,000 to 8,000,000 in the old choppings; part in trees not up to grade, part in the hemlock and cedar not then wanted, part in high stumps, but mostly in long tops. Those days we took two logs out of many a tree which we would take four or five logs to-day, and those 40 feet long.

Had it occurred to you to ask what has become of the 6,000,000 to 8,000,000 feet we left behind on each quarter section? You all know of many old choppings where fire has followed fire, and where there is no living shrub, and hundreds of branchless stubs, telling by their unsightly skeletons what might have been had no fires reached them.

You also can recall, or find, if you will, old choppings where no fire has ever run. These you will have perhaps passed by as original forests, for such they look to be. But examine them more closely—hundreds of tall trees are standing, hemlocks perhaps in part, but none the less valuable twenty years from now. And beneath and between these taller trees is a thick growth of young fir, spruce, cedar and hemlock, of all ages, rank, thrifty, giving promise of more timber to each acre, thirty or forty years hence, than was produced by the original crop.

Now look again. Crawl through that jungle and you will find many a moss covered top of the fathers of this young forest, and that top will often be 40 or 50 inches in diameter and 150 feet long, for its father was cut when timber was cheap, and that condition means waste; that timber was cut when 6,000,000 was a large yield. The other 6,000,000 left

on the ground are in among that new growth.

We all know that many a fine fir or cedar log is taken from down timber that has lain in the woods for fifty years; so if sheltered, that is, kept moist, as in the forest, that 6,000,000 to 8,000,000, or most of it, is still in existence.

With brush, ferns, tops and vines to protect the ground until the new timber springs up we know the forest conditions of dampness and shade have been maintained, except for a year while nature has rearranged her costume, and then maintained in good part.

Go then to your cutover lands, when prices are high, for then low grades are in demand, and you will find that which you cut and left twenty years ago nature has placed in cold storage and trees you left standing will have increased in size and will look good, and you will say, "Great head! to leave those trees." You will also find a thick stand of young timber, the largest of which can be cut for lumber before another twenty years.

I will give you an illustration in approximate figures actually realized. Eighty acres of timber on tide water, cut in 1886 and logged with cattle, yielded less than 3,000,000 feet of \$4.50 logs, on which the stumpage returns totaled less than \$1,500. In 1906, just after the San Francisco disaster, the land was sold to a logger for a home, and one of the considerations was that he should hold all merchantable timber, for which he was to receive \$4.50 a thousand for logging. The land had never been burned and there was about 500,000 feet of standing timber not up to grade required twenty years ago. He hauled and delivered over 2,000,000 feet of logs, worth that year \$10 a thousand. No. 1 logs were selling for \$12. This left a stumpage of \$5.50, or net returns of \$11,000, against \$1,500 returns on first cutting. And still there were logs left in the woods that some day will be hauled, and there was a forest half grown.

Nature stands ready to repair the damage to her forests by tornado, flood or ax. She has on hand seed already sown, young plants already started, shade in reserve to keep moist the ground while her pets are growing, nutriment for their tender roots, birds and bees to fertilize, animals to dig among them and plant seeds, seeds on the tops of her fallen giants ready to perpetuate their species, and if allowed she places all, in the least time possible, in a condition of greatest safety from her old enemy, the fire. But thwart her efforts and apply the torch, and as a man disheartened takes to drink so nature turns to destroy that she sought to protect. It is her wish to hide away the tops and broken logs and down timber left, and if trusted she shades them and keeps them always moist, and even fifty years hence fir and cedar will be found but little the worse for their years. But thwarted in her efforts and fought by fire and man, she exposes all to wet and dry and most rapid decays. She also prepares all for more fire, and fire again, as the drunkard destroys his body and mind.

But suppose, when you go back for the 6,000,000 feet of logs you left on the "quarter" you logged twenty years ago, you find that it has been burned. If burned but once nature may have managed to save you something, but if burned once the chances are many to one that it has burned twice, and most likely many times, for when the first fire destroys nature's shade of leaves and ferns and fallen tops and young trees she leaves all naked to blister in the sun. Then all things dry to powder, and the second fire destroys seed and soil.

So if your claim proves to be one of the many burned, instead of a timber crop half grown and half a crop left in storage, you will find dead, topless, rotten stubs where you left standing trees—charred, burned and rotten brands where you left logs, and worthless land and baked clay where you left soil.

Did you burn that chopping, and if so, why? Did you think the trees

you left would never be wanted? Were you so thoughtless as to think worthless to-day always worthless? You could not have hoped to make pasture, for you must have known the soil would burn before those tops. You could not have thought it would protect you from fire in the dry season, for you know the second, not the first, is the fierce and dangerous fire—the one that comes after the leaves are gone and the sun has had a chance.

If you burned that claim the truth is you burned it because your father and grandfather did so, for the fire on our western slope has crossed the continent—never out when weather permitted. It has come to be a tradition among loggers that they must “burn or be burned,” and beyond that they have not given the question thought. They fight brush and tops while logging the land, and it is with a quiet chuckle they apply a match and get even when the logs are off.

The first fire burns only the leaves and a few twigs that would have been food for the new forest; that and the young trees waiting for sunlight; that and some seeds on the fallen tops. But the second fire, often springing from smoldering roots, takes seed and soil and leaves all a desolate waste.

I gave you an illustration of a cutting where no fire had run. Two miles from that location there are four sections cut about the same time, and burned “when safe,” as the loggers say. Purposely burned, think of it! Deliberately burned! A clear case of grand larceny, lacking only the law. An example of the lumberman’s crime of the age. And to-day there is no living thing there and no soil. Fires deliberately set on those lands have destroyed what to-day would have been worth hundreds of thousands of dollars.

Had the first fire been kept out of all our choppings all fir and cedar timber left in the woods would still be preserved, and from this on, if the first fires are kept out of our choppings, what is not now wanted can be saved for future use, and the growth of our

young timber will yet furnish a large percent of future needs.

To those who say the first fires can’t be kept out (and there are many) we answer the word “can’t” and the phrase “can not” are obsolete and no longer admissible among Americans. Instead we substitute the phrase “Will it pay?” And again I answer, a man by night and a man by day on each corner of every section of old choppings for six months each year would leave a fine margin of profit and a new crop to spare.

Cut trails, increase the number of our fire wardens, give them motorcycles, build them watch towers, connect them by telephones, set mathematical instruments with which to define the location of the first whiff of smoke. Inspire the people with as healthy a dread of setting a fire in the country as they have of setting a fire in the city. Take the idea out of the lumbermen’s heads that “it is only an old chopping.” Many a lumberman has remarked this fall, “the fires did no great damage, they burned mostly in old choppings.” Of the two never mind the green timber. If that burns it can be cut and sawed, but guard and protect the old choppings, nature’s cold storage and nature’s new nursery, where she is trying to replace man’s depredations. And, first of all, stop railroad locomotives from emitting sparks. Nothing can be done that will save our timber until the railroads are prevented from burning their greatest source of future revenue. They are responsible for nearly all the forest fires to-day. Along their routes, go where you will, except oil is burned, you will find on each side only ashes and brands, and if there is anything left to burn and conditions are right you will see it spring into flames as you pass.

The object of this paper is to show the crime, not the remedy. Study the work New York is doing in the Adirondacks, and the results obtained by European methods, and the methods adopted by some of our other states, and take a fearful lesson from the shocking results of our methods as they show for themselves in Minnesota, Michigan and

Wisconsin, where hundreds of thousands of stubs that would to-day have been worth \$20 a thousand if standing, are all that is left of vegetation or of soil which once was fertile land and should to-day have a second crop ready for harvest, and that crop worth ten times the price received for the first.

The old argument of the western logger is "burn when safe for it will burn anyway and perhaps burn you." This, if applied to your house, would read, burn your house when it rains so it won't burn your neighbor, but burn it for it will burn anyway and perhaps you. But the logger's argument is not as good as the parallel, for the one burning of the chopping only prepares all for the second burning, which is more likely to occur than the first, and far more fierce. Your home once burned is removed from further danger of fire. To repeat, that which the first fire takes would all have been nutriment for the new timber crop in a year; that, and the young trees that were waiting for the sun; that, and the trees left standing ready to push ahead for early cutting; that, and the brush which would have in another year replaced its broken parts and held a sunshade over all; that, and the vines and ferns that would have helped keep all moist; that, and preparation for fires to burn the soil and all seed and bake the ground into a condition of utter impotence from which it can not recover in a generation. These things are all that the first fire does, nor does the second fire clear any land. I have known seven fires to

run over the same ground and to-day there is no living thing there except a growth of fire weed, ready to carry fire to the material still left, which is ample for more fierce flames.

Of all these forest fires the first is easiest to prevent. Brush, moss and the shade of the fallen tree tops keep the ground still moist. The dead soil and sun are ready to grow a shelter while the new forest springs up to give its perfect shade. Nature helps to keep out the first fire and in a few years places the old chopping in a condition as safe as her older forest areas.

The first fire is but the loss of the nail, in the old proverb, that caused the loss of the shoe, that caused the loss of the horse, that caused the loss of the rider. The moral is, replace the nail and, in forestry, keep out the first fire.

If the first fire had been kept out of the state of Washington the annual growth of the new timber crop would be fully the equal of the annual timber cut, and the land cut over in the 50's would to-day be ready to yield more feet an acre than did the original cutting.

When, therefore, we have found a practical method of preventing the first fire in our choppings, where the land is principally valuable for the timber crop, we shall have solved the great problem of timber conservation on the slope from the Cascades to the ocean. All else is detail. He who would leave to our children that which is theirs must keep out the first fire.





Veteran Sitka spruce in creek bottom near Ketchikan, Alaska

THE FORESTS OF ALASKA

By R. S. KELLOGG

(Abstract of United States Forest Service Bulletin, No. 81.)

MORE than one-third of Alaska's immense territory is yet but little explored. The permanent population at the present time is estimated at some 40,000 white and 25,000 natives; about half of the latter are Eskimo in the region adjacent to Bering Sea and the Arctic Ocean. The most important product is gold, of which the output in 1908 was valued at more than \$19,000,000. Fisheries rank second, and the salmon packed in 1908 had a value in excess of \$10,000,000.

Most of the internal improvements of Alaska have been made by the War Department. The telegraph system is constructed and operated by the Signal Corps, with offices at all important points. Transmission depends not only upon cable and land lines, but on high-power wireless stations as well. Roads are built chiefly by the corps of engineers of the War Department. Rail-

roads, except for short lines running out to a few mining camps, are utterly lacking, and the total railway mileage does not exceed 350. Alaska has 4,000 miles of navigable rivers; without them most of the present development would have been impossible.

On the coast of southeastern Alaska trees grow to large size; in the interior the timber is much smaller. The higher mountain areas are completely above the timber line.

The coast forests of southeastern and southern Alaska are nearly all included in the Tongass and Chugach national forests, which comprise 26,761,626 acres, and a large proportion of this area is forested.

In the coast region the stand is generally dense, and as much as 25,000 feet per acre has been estimated for considerable tracts. Sitka spruce probably



Looking across an Alaskan tundra towards Nome and Norton Sound. Small lakes and mining operations in middle distance

averages twenty per cent of the stand and western hemlock about seventy-five per cent. The spruce reaches a large size, and occasionally attains diameters of more than six feet and a height of 150 feet. Diameters of three to four feet are attained by western red cedar. While by far the most abundant species, western hemlock does not produce as large individual trees as the spruce or the cedar. The heavy rainfall causes an undergrowth of moss and brush which completely covers the surface except where it is too rocky or too steep.

Practically the entire forest of the coast region is over-mature. It has been accumulating for ages, uninjured by fire or cutting. Shallow, rocky soil, steep mountain slopes, or poor drainage often prevent thrifty growth, and on such sites "stag-headedness" and decay are common. In favorable situations the rate of growth of the coast trees is fairly rapid.

The forests of interior Alaska are practically all included within the drainage basins of the Yukon and Kuskowim rivers. They are chiefly of the woodland type, and are estimated to cover approximately 80,000,000 acres, but probably not more than 40,000,000 acres bear timber of sufficient size and density to make it especially valuable for either cordwood or saw logs.

The white spruce is the most important, since it furnishes the only saw timber of the region, and is also much used for fuel. White birch is extremely abundant, as are also poplar and aspen,

in many localities. Black spruce is of general occurrence and abundant. Mixed forests of all species are common, though there are occasional pure stands of each species."

Obviously, all the forests of Alaska, whether on the coast or in the interior, should be protected and made of the utmost permanent use. The coast forests, which include most of the saw timber of the territory, and by far the heaviest stands, are nearly all protected by inclusion in national forests. They have not been damaged by fire, and are but slightly reduced by cutting. They are over-mature. Carefully planned cutting should take place as soon as possible. Every effort should be made to have them utilized for lumber, and especially for pulp. They should be so managed as to increase the stand of spruce and decrease that of hemlock. In the interior forests, situated entirely upon public lands, unregulated cutting and devastating fires are going on. The coast forests were reserved before they were impaired. Those of the interior have already been seriously damaged. Their protection cannot begin too soon. While the products of the coast forests need a foreign market, the interior forests with the best of treatment are not likely to supply more than a part of the home demand. If protected, they will continue to furnish logs for cabins, low-grade lumber, and fuel indefinitely. Higher grade lumber required by the interior must always be imported.



Upper limit of forest, Cleary, Alaska. Small. blocks spruce, shrubby birch and willow, with
|grass above



Typical Yukon River flat, Alaska. Forest of small white spruce with some balsam, poplar
and willow, within the Arctic Circle



Typical aspen, with scattering birch and spruce at left. Buildings are at Fort Egbert.
Eagle, Alaska



Birch grove on the Fox-Fairbanks road, Fairbanks District, Alaska, cut over
and then swept by fire



Raft of spruce logs, containing 190,000 feet log scale, in an inlet on Eastern Passage, near Point Madan, Wrangell, Alaska



Another view of raft and inlet on Eastern Passage, near Point Madan. Spruce, cedar, and hemlock timber on shore



View across Nome Hills, from top of King Mountain. Elevation of hill in the background 1,700 feet. Vegetation of the tundra type. Nome, Alaska.



Harbor and town of St. Michael, Alaska, the shipping point for Yukon River traffic

THE PROTECTION OF FORESTS FROM FIRE

By HENRY S. GRAVES

Forester, United States Department of Agriculture

Part IV—Continued from November Number

Cleared fire-lines are also used in extensive pine forests on dry, sandy land. Fires start easily and run swiftly under such conditions, and fire lines are easy to construct and comparatively cheap to maintain. Thus, in the pine forests of northern Germany and southern France, wide cleared lines are used to supplement the road systems.

The danger from fire is always very great in the regions of the Tropics that have a pronounced dry season. In India, for example, fire protection constitutes one of the greatest problems of management. The forest becomes very dry in the hot season, and there is a great abundance of grass, which ignites readily and carries fire swiftly. Under these conditions cleared fire lines are absolutely necessary for efficient protection.

The width of fire lines varies greatly under different conditions. In general the following classes from the standpoint of width may be recognized: Normal, from 6 to 15 feet; wide, from 15 to 30 feet; very wide, from 30 to 60 feet. In Europe fire lines are usually about 10 to 15 feet wide, but in the pine plains they are often as wide as 50 feet.

In this country such fire lines as have been constructed are usually less than one rod in width. In the chaparral of California, however, broad lines from 40 to 60 feet wide have given the best results in stopping fires.

It is seldom necessary or practicable to make fire lines over 60 feet wide. Usually it is more economical to make a number of narrow lines rather than a few very broad ones.

In constructing a fully cleared fire line the timber and brush should all be

removed or disposed of to the desired width. Where it is impossible to utilize the timber, the logs may be left along the side of the lines. The brush and other débris should be burned. Piling the brush along the edge of the line is a dangerous practice. As a rule, the best plan is to burn the brush in piles in the cleared area, and then burn the ground litter by a broadcast fire.

In the best permanent lines the stumps are all grubbed out and the soil is occasionally stirred by grubbing or harrowing. Sometimes only a part of the line is cleared to the soil. Thus, for example, the timber and brush may be cleared from a strip from 10 to 15 feet wide, and a narrow strip or trace about four feet wide ground-cleared. This cleared trace may be located in the middle of the line, or on one side. A good plan is to make two traces, one on each side of the fire line. The advantage of the last plan is that it affords a very good protection when burning the debris on the line.

The method of constructing a narrow, ground-cleared trace, covering only a part of the fire line, is very commonly used where there is a deep duff on the ground. It is then a question of protection against ground fires. Under such circumstances the trace is usually a trench. In the north woods the duff is frequently two feet deep. A narrow trench, from one to three feet wide to the mineral soil, suffices to stop or check a ground fire. The trees and brush are cleared for a width of from six to 15 feet, to facilitate work in fighting fire and in constructing and maintaining the trench.

Fully cleared fire lines should be cleaned off every year or two. The leaves and other *débris* accumulating upon them should be removed by burning or otherwise, and in the case of grubbed lines the soil should be stirred over by raking or harrowing.

The work of burning over the fire line can best be done in early spring. The leaves and other *débris* will become dry on the open fire line sooner than in the adjoining forest or chaparral. The aim should be to do the burning at exactly the time when there will be the least danger of the fire spreading to the woods. It is, however, not always possible to organize the crew so as to have the work done at the most favorable period. In the case of an extensive tract the work may be begun exactly on time, but the whole woods may become dangerously dry before it can be finished. It is especially difficult to carry out this work of burning over the fire line in open pine woods on dry, sandy soil.

When the burning has to be deferred until the woods as well as the fire line are dry, great care should be exercised in the work. If the ground cover consists of leaves or needles, the procedure is as follows:

Narrow, cleared traces are made on each side of the fire line proper by raking or brushing aside the leaves, or needles, and *débris*. Sometimes, in flat, level areas it is possible to make the trace by plowing one or two furrows. Usually these traces need be no more than a foot wide. A fire is set along the side of the fire-line. One or more men follow this up, constantly brushing the burning or smoldering embers toward the center of the fire line, the idea being to keep the fires confined between the traces. Other men follow behind and watch the burning area to prevent a possible spread of fire. If there is a strong wind, no burning should be done. If there is a slight wind across the line, one trace may suffice on the lee side, and the burning should proceed against the wind. Under ordinary circumstances a crew of from four to six men suffices for burning

over fire lines, but if the weather is very dry a much larger crew may be required.

In very dry weather the burning is best done early in the morning or in the late afternoon and evening. The air is moister and there is usually less wind at those times.

In California several interesting experiments in keeping down the brush on the broad lines are being tried. One is to pasture on the line a flock of goats, which eat down the new weeds and sprouts, and trample the ground. Another is to establish on the line a dense growth of succulent herbaceous plants, which would tend to keep out ordinary weeds and obviate annual or periodic grubbing.

The cost of constructing fully cleared fire lines varies enormously, just as does the construction of a road or trail. The cost of clearing the line depends upon the width, character, and quantity of timber and brush to be cut, the quantity of tops to be disposed of, and the character and quantity of ground *débris*, as well as the labor, the difficulties of work, the efficiency of organization, etc. If the ground is grubbed, the cost is affected by the character of the work done, the difficulties of working the ground, and the topography. In general, the fire construction of an 8-foot fully cleared line costs anywhere from \$10 to \$100 per mile. An average for a second-growth woodlot would be from \$30 to \$50. If there is a good market for cord-wood and other material, the timber might return 50 or 60 per cent. of the whole cost. The wide fire lines in southern California cost from \$100 to \$200 per mile. They are now cleared every two years at a cost of from \$50 to \$75 a mile, and the cost of maintenance will be progressively smaller from year to year.

Tree-cleared Lines

By a tree-cleared line is meant one from which the trees and brush are removed, but from which no effort is made to clear the leaves or other small

litter. The object of such lines is not to stop a fire, but to furnish a vantage ground for patrol and for fighting fires. The brushing out of all wood roads, already mentioned, makes the best kind of tree-cleared lines.

Very frequently special tree-cleared lines are made where there are no roads or trails, as, for example, along the boundary of a tract, about a recent clearing around a body of young timber, etc. In Europe such lines are often made between two compartments where there is no road or other permanent boundary.

The width of tree-cleared lines is usually from 6 to 15 feet. The European tree-cleared lines between compartments are usually about 6 to 8 feet. Often a line from 10 to 15 feet is cut, especially where a road may later be located. In a number of instances in this country very wide lines have been cut, 75 or 100 feet in width. Such great width is ordinarily unnecessary. Strips a rod wide are usually of fully as great value as the very wide lines, except in conifers, where there is danger of crown fires. The maintenance of these lines consists in brushing them out every year or two.

Ground-cleared Lines

By ground-cleared lines are meant strips on which the small brush and ground debris are destroyed, and the larger trees are left standing. Ground-cleared lines may be made in open woods, where there is little or no undergrowth to be injured or to interfere with the work of clearing the ground. The usual procedure is to burn a strip through the woods from 10 to 20 feet wide. This can be done only where the conditions are such that a surface fire may be controlled and restricted to the desired strip.

The open pine woods of the South present an ideal condition for the use of ground-cleared lines. In burning the lines practically the same methods as those described for burning over regular fire lines should be used.

Location of Fire Lines

The existing roads usually constitute the base or framework of a system of fire lines. Ordinary roads, old wood roads, skidding trails, and other open strips are used first, and special lines are constructed only when necessary. Special lines should always be located at the strategic points.

In any given forest the boundaries should first be protected. There must be protection from fires that may start on a neighboring tract. Often roads running along or near the boundary will give adequate protection. If not, and there is danger of fire entering from the outside, a fire line is desirable, even if it is only a tree-cleared strip.

Fire lines are often constructed around recent cuttings, where there is young growth established or on areas where there is still considerable slash.

One of the places where fire lines are most needed is along railroads. It is the custom of certain railroads to keep their rights of way clear, usually by annual burning. In some states this is required by law. In spite of this precaution, innumerable fires are set on the right of way, and very commonly by sparks thrown into the woods beyond.

Many special fire lines have been tried. In general, these are based on the principle that the right of way should be cleared, then a strip of woods left standing, and then a second cleared fire line constructed back of this strip of timber. The theory is that the trees on the timbered strip will catch the sparks thrown beyond the right of way. Any fire set by these sparks on the timbered strip will be stopped by the second fire line.

This principle has been used in a number of instances in this country. One good example is found in a hardwood forest in southern New York. A railroad runs through the tract, along a stream valley. The stream acts as a fire line on the low side of the railroad, but the opposite side is exposed to frequent fires resulting from the sparks

escaping from locomotives. A stretch of several miles is on a steep grade, and the locomotives under forced draft, throw out great showers of burning cinders, and no spark arresters whatever are used. As a protection, a fire line varying in width from 8 to 15 feet has been constructed on a bench at a distance of from 50 to 150 feet from the railroad. (Pl. IX, fig. 1.) The strip between the line and the railroad is left untouched. A patrolman rides over the strip about the time the trains going up grade pass by. Ordinarily the small fires are extinguished by beating. In case, however, a number of fires are started by a train, as often happens, one or two of them burn over the strip to the fire line before the patrolman can reach them. The strip is so narrow, however, that they gain little headway, and are absolutely stopped by the fire line.

In mountainous country, fire lines are located with reference to the topography. Where roads are used, or fire lines are made that are intended to be used later as roads, the location is governed largely by the principles of road construction. Special fire lines, however, constructed for protection alone, are built mainly on the crest of ridges. (Pl. VIII, fig. 2.) Thus, the wide lines in southern California, already mentioned, are on the various ridges. A fire runs up a slope very rapidly and works over a ridge slowly. If there is a wide, cleared fire line on the ridge the fire may be stopped entirely by it alone. In the southern Appalachians and other mountains, the old mountain trails on the ridges may be developed into admirable fire lines.

The question of when and where to construct special fire lines depends on local conditions, the danger from fire, the value of the forest, the organization of patrol and force available for fighting fire, the object of the owner in protecting the forest, and many other factors. As with other operations of management, the expense must be justified by the results which their construction is intended to accomplish.

Artificial Fire Obstructions

It is well known that a small, creeping surface fire is stopped or checked by a stone wall or other similar obstruction. This principle may be used in fire protection, and other types of fire lines may often be dispensed with where there are such obstructions. A well-known railroad has been experimenting with a specially constructed fire wall.

SUPERVISION AND CONTROL

A careful supervision or patrol during the dry season is one of the most important measures in organized fire protection. Its purposes are: (1) To prevent fires from starting; (2) to detect fires as soon as possible after they start; (3) to fight fires.

The mere fact that a tract is carefully watched makes it safer, because campers, hunters, and others crossing it are less careless on that account. By an efficient supervision most of the unnecessary fires can be prevented, such as those arising from carelessness in clearing land, leaving camp fires, and smoking; from improperly equipped sawmills, locomotives, donkey engines, etc.

One of the fundamental principles in fire protection is to detect and attack fires in their incipency. In an unwatched forest a fire may burn for a long time and gain great headway before being discovered. In a forest under proper protection there is some one man or corps of men responsible for detecting fires and for attacking them before they have time to do much damage or to develop beyond control.

Aids to Supervision and Control

Under the head of aids to supervision and patrol are included: (1) The posting of fire warnings; (2) lookout stations; (3) telephone systems; (4) signal systems.

Posting of Fire Notices

One of the first steps in organizing protection in a forest is to post it with fire warnings. These notices emphati-

cally warn against carelessness in the use of fire, and often give instructions how to construct camp fires and how to extinguish them when breaking camp. They usually contain also the prescribed penalties for infringement of the fire laws. Notices are posted at frequent intervals along roads and trails, at camping grounds, near permanent camps and settlements, and in many cases along the boundaries of tracts. On private tracts the fire warning is combined with the trespass notice.

In the National Forests fire-warning notices are printed in English, Italian, French, and Spanish. Notices printed in Italian are posted where Italians are employed in the railroad construction or section work. Spanish notices are used in New Mexico, southern Arizona, or other localities where there are many Spanish-speaking people. Near the Northern boundary French notices are sometimes used. Beyond question many forest fires have been prevented by these warnings.

In the case of a forest owned by a nonresident it is a good plan to have on the notice the name of the responsible local agent, as well as the owner's name. This lends emphasis to the fact that there is a local man who is looking after the property.

Lookout Stations

Lookout stations include watch towers, mountain lookouts, and other elevated stations used for overlooking tracts and watching for fires. On small tracts they consist usually of some simple structure which enables the person responsible for the property to overlook the forest to see if there are any fires, and, in case he sees smoke, to locate the fire. Sometimes an arrangement on the roof of the house or barn serves as a watch tower, or a lookout may be built in a tall tree, or it may be necessary to build a rough tower to see over the tree tops. In a rugged country it is usually possible to find some convenient peak from which a large area can be looked over. (See Pl. I.)

In the organization of large tracts in mountain regions special lookout stations are sometimes provided. These are located at high points from which a large area of the forest can be seen. A man is kept constantly at each station during the dry season. The various stations should be in communication by telephone or telegraph, or by some system of signals. Each is provided with range-finders or other equipment, by means of which any fires that may occur can be precisely located. They are also in communication with the forest ranger or superintendent at headquarters, so that a force of men may be called at once to the fire and put it out. In extensive mountain regions these lookout stations constitute an important part of organized fire supervision. They have been successfully operated in the National Forests.

Telephone System

One of the great difficulties in extensive forest districts is to secure the necessary help in fighting fires. The telephone is the greatest aid in fire patrol. It enables the man who discovers a fire to call for help and to give directions as to the number of men and the equipment needed. By the use of the telephone in the National Forests millions of dollars have doubtless already been saved. The Forest Service has since 1906 built 4,850 miles of telephone line, and it is extending the lines as rapidly as Congress furnishes the funds for the work.

Signal Systems

When there is no telephone system and a regular lookout station is not feasible, a special system is used for signaling for help in fighting fire. Some prominent peak is selected, from which, in case of fire, the location and size of the fire and the required help are signaled by a prearranged code. There are various systems of signals in use. The fire signal is one of the oldest methods. At a time when the signals are not needed small piles of wood, brush, or other inflammable material

are gathered and placed in position at about equal distances, usually about 50 to 100 feet apart, ready for firing on short notice. The number of fires burning at the same time conveys the information required. Thus, one fire might mean that a forest fire is burning in a certain locality on one side of the mountain; two, in another locality; three, in another; and so on.

Another system that is sometimes employed is the smoke signal. This was once very commonly used by the Indians in communicating with each other from one distant peak to another. A small fire is built, and after it gets under headway, damp moss or earth is used to deaden it and develop a heavy smoke. A blanket or other covering is thrown over the top of it to smother the smoke down for a few moments. The blanket is then raised, and a dense puff of smoke is released. The blanket is again thrown over the fire to check the smoke for a moment, then it is again removed, and another puff of smoke ascends. This system also requires a prearranged code. The smoke signal may be used in the same manner as the fire signal, by causing two or three separated columns of smoke from dampened fires to be steadily rising at the same time. This system of signaling may be used to good advantage on a still day for communicating long distances. The separated fire signal on top of prominent peaks can be used in the night as well as in the day.

The heliograph is an instrument which may be used for flashing signals from the lookout stations. The Forest Service has recently conducted successful experiments with this instrument.

Another system sometimes used when the wind is blowing and the sun is shining is a windmill signal. A small windmill is set up on some conspicuous elevation. This is provided with a small belt and pulley connecting with a revolving ball or wheel in which small mirrors are set at different angles. In case a fire starts and the wind is blowing, the watchman simply connects up his windmill with the ball in which the mirrors are set, and goes on to the fire,

leaving his automatic signal to flash to the settlement the news of the fire and the fact that assistance is wanted.

In some cases it might be possible to use flags and the code of the Army Signal Corps. Near settlements the fire bell, gong, or whistle is commonly used to bring together the men for fighting fires.

The organization of an efficient patrol varies under the following conditions: (1) Size of tract; (2) character of the forest; (3) condition of the forest with reference to the amount of inflammable material; (4) difficulties of communication; (5) difficulties of securing help in fighting fires; (6) the topography with reference to the amount of territory which can be overlooked; (7) special sources of fire, such as the presence of a railroad; (8) local sentiment.

Supervision of Small Tracts

The supervision of a woodlot attached to a farm is exceedingly simple. If a farmer himself uses proper care in starting fires, in clearing out his roads, in disposing of brush, and in keeping a careful watch for fires, his woodlot is comparatively safe. Many woodlot fires are caused by the owner's own carelessness in clearing land, destroying brush, burning meadows, etc. The fact that the owner is careful in the matter of fires becomes known very quickly in the neighborhood, and that fact in itself is a great protection. It is not necessary for a farmer to patrol his woodlot at regular intervals, as would be necessary in the case of a large tract.

Many fires start on the property of nonresident owners, who themselves are unable to supervise it on the ground. Nonresidents may secure protection by an arrangement with some farmer living near the forest. The usual course is to pay a small retaining fee for general supervision, with the understanding that the farmer goes over the tract every few days, thus giving the impression of constant patrol. In case fire starts, the agent has the responsibility of repairing to the fire and putting it

out and employing such help as is necessary. There is no reason why this plan should not provide adequate protection for tracts of from 100 to 500 acres at an annual cost of from three to five cents an acre.

One of the most essential measures in the protection of small tracts is to secure the cooperation of the owners of all the neighboring tracts in watching for fires and in mutual assistance in extinguishing fires, no matter on whose land they may start.

Supervision of Large Tracts

In the protection of large tracts from fire a special organization for patrol is necessary. This organization can best be combined with that required for the management of the tract. In every forest that is being developed there is necessary a certain force to supervise any work such as logging, the construction of roads, the protection of game, the prevention of trespass, etc. This organization is best illustrated in the National Forests. There is a permanent corps of trained rangers who live on the Forest, each in charge of a specified area. These men have executive charge of all the work in the woods. During the dry season this force may be supplemented by temporary forest guards for special fire patrol. Each guard is assigned to a specified part of the Forest, which he is required to patrol regularly; he prevents the start of fires as far as possible and watches for any fires which may start within his range. It has already been explained that one of the purposes of the construction of trails through the Forests is to enable constant patrol and access to fires which may be started. The guards ride or walk over these trails under a systematic plan. There is usually a regular beat over which the guard travels at regular intervals. In some tracts it is possible to go over the beat once a day; in others it requires a much longer period. When not on patrol the guards are engaged in the general work on the Forest.

In the plan of control the guards keep in close touch with each other and with the ranger in charge of the whole work in order that they may communicate in case of fire by signal from outlook stations, by telephone, or any other method of communication that may be established in the Forest.

Most of the National Forests of the West are in rugged mountain regions, with comparatively few roads and trails. The guards usually travel on horseback over certain roads or trails, keeping track of the people who enter the Forest, and giving them special warning regarding carelessness with fire. In this way each person entering the Forest is impressed with the fact that his movements are watched, and the result is that he is more careful with camp fires, smoking, etc.

On large tracts patrol is concentrated at critical points. The guards spend most of the time where there is the greatest travel, frequently inspecting camp grounds, sawmills, and other points where fires are most likely to start.

In some instances the actual patrol over trails is more or less dispensed with, and men are kept continuously at lookout stations, from which a large area can be overlooked. In case of fire, signals are sent to other lookout stations and to headquarters, with the necessary instruction regarding the location of the fire, the number of men needed to fight it, etc.

It is impossible to give a specific rule regarding the number of men required to protect tracts of different sizes. There is no question that the National Forests are very much undermanned. In some cases a single man has the responsibility of protecting more than 100,000 acres. This area is much too large even under the most favorable conditions, and it is only through the most efficient work that the damage by fires has been kept down to 1.86 per cent. of the forest area. Even with the proper facilities for communication, the fire protection force on the National Forests should be quadrupled. Very good results would be obtained if

there were, during the dry season, one guard for each 20,000 or 25,000 acres. This will follow naturally as the increased receipts from the Forests justify a more intensive management.

In flat regions more men are required for patrol than in rugged country, where large areas may be overlooked from prominent elevations. It has been the general view that in flat regions like the Lake States and the plateau portions of Maine and the Adirondacks there should be at least one guard for each 10,000 acres.

The required force of guards is governed by the risk of fire and the value of the property to be protected. In the case of a forest of very great value there is necessarily a correspondingly greater justification for expenditure in fire protection, just as one takes out fire insurance in proportion to the value of his property. As the value of our forests increases, there will be a correspondingly greater amount of money spent on protection. This principle is illustrated in Europe, where the forests are very valuable and where frequently there is one forest guard for each 1,000 acres. (Prussia, one for 1,700 acres; Baden, one for 750 acres.)

Patrol Along Railroads

Railroads in many cases are the most prolific source of fires. In some sections over 50 per cent. of the fires are from the sparks from locomotives. While most of these fires could be prevented if the railroads used proper appliances on the locomotives for arresting the sparks, nevertheless, in many cases, it is probably impossible to prevent sparks which will start fires in very dry weather. It is, therefore, necessary to supplement the use of spark arresters by patrolling the right of way.

The most effective method of patrol is to follow every train with a speeder equipped with mattocks, shovels, pails, and other necessary equipment for fighting fires. A fire started by a spark from a locomotive may be put out before it has an opportunity to gain any considerable headway or to do much damage.

It is not always practicable to follow every train a long distance, and it may happen that there is danger from the sparks only at steep grades. In that event the patrol is concentrated at the dangerous points.

The plan of following every train by patrolmen may be practical where the distance traversed by the road is not great, but it would not be feasible for a great mileage. Thus, for example, the problem of patrol is being considered by certain large railroads with the view of applying it over the entire system, wherever there is danger from fires. The purpose is to save the annual expense of fire damages. Thus, one system in the northeast, covering not over 2,000 miles, is said to have an annual expense of \$50,000 for forest-fire claims. It is probable that the most practicable method of supervision of the right of way would be through the organization of section men, with a special patrol at certain grades where the danger from fires is particularly great. There is no reason why the section men, if provided with proper speeders and other equipment, should not be trained to repair at once to fires which may start along the right of way and put them out, with comparatively small loss of time.

In Minnesota the law requires that railroad companies must put on patrolmen to patrol their tracks. The forest commissioner may compel the companies to put on as many as one man to each mile of track.

(To be concluded in January.)



ROBERT PERKINS BASS

Governor-elect of New Hampshire

By PHILIP W. AYRES,

Forester of the Society for the Protection of New Hampshire Forests

ROBERT PERKINS BASS, who has just been elected triumphantly Governor of New Hampshire, deserves the honor. While serving two terms in the State legislature as representative and one as senator, he secured the passage of a number of important bills, including the forestry bill that has transformed the forest service of the State. His most important legislative achievement is the passage of the new primary law, by which the State has rid itself of political conventions and of the domination, through them, that corporate interests, particularly the railroads, had obtained. Popular approval of the primary system was clearly expressed in the primary elections held a month ago, and the final elections on November 8 gave Mr. Bass a larger support than has been given to any governor in recent years. He led the movement that abolished the granting of free passes by the railroad companies. He secured also a bill equalizing the taxes of the State, by which the corporations paid last year an increased tax of more than \$300,000.

Prior to these successful efforts in reform, Mr. Bass accomplished a heroic task in changing the old forestry commission, a political body, into one of the most progressive and useful commissions to be found in the country. It is his work in the cause of forestry that chiefly concerns this article.

Mr. Bass was born in Chicago, September 1, 1873, and is a graduate of Harvard College and Law School. His family came to New Hampshire from Chicago some years ago, as summer residents, and acquired a large tract of

land near Peterboro. In managing his own woodlands, thinning the old stands and planting new ones, he soon became a permanent resident. Mr. Gifford Pinchot and Mr. Henry S. Graves, then director of the Yale Forest School, are his personal friends. Through their suggestion a government experiment station was established on his property, by which thinnings of various kinds were made and recorded on definite areas for observation during a period of years.

It may be said that Mr. Edward N. Pierson, secretary of State in New Hampshire, discovered Mr. Bass in the state, because it was he who invited Mr. Bass to become a member of the State Forestry Commission, which was Mr. Bass' first public office. As a member of this body, he was for a long time in a hopeless minority, but wisely abided his time. Later, with the appointment of Mr. Robert E. Faulkner, of Keene, upon the commission, the two were able to secure control of the body. They promptly brought a bill into the legislature abolishing the old bi-partisan board. A new commission was created of which Mr. Bass was naturally appointed chairman. The same bill reorganized the forest fire service of the State and provided for a State Forester.

The new forestry commission having other able members and a trained man as State Forester, has made a distinct record in New Hampshire. Fire wardens have been appointed throughout the State. Private contributions have been secured by which thirteen stations have been located on the tops of mountains, connected by telephone with the

fire wardens, for the discovery and control of incipient fires before they become conflagrations. The beginnings of a state nursery have been privately established, by which seedling forest trees will be distributed at cost for experimental purposes to the owners of waste lands. It is confidently hoped that the forthcoming state legislature will adopt both the fire stations and the nursery. Mr. Bass has been keenly interested in

the success of the Society for Protection of New Hampshire Forests and for two years has served upon its executive committee. Last January he accepted membership in the board of directors of the American Forestry Association.

With Mr. Bass as governor, and with the present favorable sentiment throughout the State in favor of forestry, a wide opportunity is now open for progressive work in the State.

CONSERVATION

By C. S. HARRISON

President of the Nebraska Park and Forestry Association

(An address delivered at the summer meeting of the Nebraska Horticultural Society.)

WHEN the Creator turned this great land over to us it was a region of surpassing beauty. For long millenniums He was at work, employing the highest art and skill for its adornment. The whole country was landscaped on a most magnificent scale and with a far-reaching forethought for the future. Everything was provided for. It was the patient work of ages to spread a thin layer of soil over the rocks and on the hills and mountain sides, and then fasten it there with trees, shrubs, and grasses. Mighty rivers flowed to the sea, fed by thousands of streams which sang merrily on their way. These streams were carefully protected. Forests, bushes, and rank vegetation prevented the washing of the soil, while at the sources of all these rivulets there was the most careful planning to retain the waters. Dead leaves, decaying trees, mosses and the accumulated deposits of the ages all were like vast sponges to retain the waters so that the streams would have an even flow. Mighty forests were planted. They grew and decayed. And so, as the centuries passed, the land grew richer and richer.

How artistically all was arranged! There were often delightful parks in the forests, and when the woods edged upon the prairies there were tall trees

in the background, shrubs to the front, then the flower-sprinkled carpet of green.

Go into the forests, the great temples of God. What massive columns upheld the dark green canopy. Look where you would, in woodland, plain, and mountain, the ages of the past had made preparations for the ages to come.

Then came the two brothers, Graft and Greed, with no thought or care for the future, with no appreciation whatever of the plans of the Creator. And a careless government, which to-day, from its own natural resources, could have had income enough for current expenses, allowed billions to be taken and destroyed. One of the most beautiful sights on earth is a splendid forest. One of the saddest spectacles is to see that same forest the prey of the destructive ax and fire—blackened stumps, like the gravestones of departed grandeur. If the lumberman had planned for the most speedy and utter ruin, he could not have prepared a more complete system. He took only half of the tree and left the rest to dry for the great tinder box. The fires came. All that dead rubbish was ready for them. Not only was the dead brush burned, but the age-long deposit of dead leaves, rotten logs, and rich mould needed to feed the soil for the coming eons; all were destroyed, and a garden of Eden

became a blackened wilderness. How the ruin has spread! Within the memory of man the mighty forests of Indiana and Ohio were chopped down and burned. If left till to-day, they would be worth more than all the crops grown there since their destruction. Take Arizona, for instance. The forests have been cut from the mountains. The rubbish invites the fires, and the fires never miss an invitation. Great flocks and herds of sheep and cattle were driven in, and they have destroyed the herbage which fastened the thin layer of earth to the rocks. The floods came and ripped the earth from the mountain sides and whirled avalanches of mud into the fertile valleys, often plowing out great gullies twenty and thirty feet deep through the rich soil, and all hurried on to fill the river beds. Now, when the floods come, there is nothing to detain them, and the people of Texas must suffer from the vandalism of Arizona.

There are no richer lands on earth than the great prairies of the west, and here in God's richest garden there have been two sources of disaster. The first is cropping lands without remuneration; raising wheat year after year with no manure, till some of the richest farms of Minnesota are now so reduced they will hardly raise chicken feed. This system of waste applies to rich, level lands. There is a double system applied to hillside lands—robbing the soil and allowing it to wash. I have known the richest soil to be swept away by a single heavy rain, so the whole furrow would be gone, and you could see the plow marks. Stand by any of our streams after a heavy rain and you will see the very cream of our fields going to the Gulf of Mexico.

It is waste, waste, everywhere. Most feeders will have their feed lots perched on some steep hillside, if they can find such a place, so that the richest fertilizer the world produces can be utterly swept away without any trouble on their part, and they keep on growing twenty-five bushels of corn to the acre, when, by saving the manure and plowing their land deep, they might have 100 bushels.

Our coal lands with their marvelous deposits, have been well-nigh given away. I have seen veins of coal eleven feet deep which the wise United States government sold for \$10 per acre. Streams with waterfalls that were gold mines have been parted with for a song.

Go into Colorado, and vandalism is there. The mountains are robbed of their beauty. The upland pastures are over-grazed, and you have desolation instead of beauty. A pioneer in the Rockies once said to me: "I think we early settlers should have great credit for coming in here and starting things." I replied: "If you never had seen this country, and had left it to-day as God made it, it would be worth five times as much as it is now."

Our railroads are great civilizers, but the fires set by the engines leave a track of barbarism behind them. See how it is in Washington and Oregon. The lumber barons who have wrought such ruin at the north are now at work among the grandest forests ever grown. They seem to concentrate all their energies there to complete the work of ruin. In some instances, every device is resorted to to get possession of lands which belong to the people. Take the Appalachian Mountains. The forests are being cut down; the beautiful rivers are filled with rubbish; sand and stones are carried onto fertile valley farms. In a short time, eighteen millions of damage was inflicted, and yet Congress looks on in indifference while the horror grows.

When you come to the farm, you see also a terrific waste there. In the east the soil is washed away and the rocks and stones are left; no thought or care is taken to save the soil. Many beautiful regions where heavy crops were grown are now deserted, and you can buy farms for half what the buildings would cost.

What wonder, in the midst of all this ruin, that a "Great Heart" should arise? He looks on the past, and then on the present, and then into the future, and he asks himself what will become of

this nation 200 years from now. In the ordering of Providence, when a tremendous crisis comes there is always a man to meet it. This time it was Gifford Pinchot, by education one of the best foresters the world has produced. A man of means, he is not hampered in his work. He is ready to sacrifice thousands for the future. He might have made judicious investments in the great west he knew so well, so he could have become a billionaire. He might have taken his chances in an unguarded moment and captured forests, water powers, and coal lands. No man since the days of Robert Morris, who furnished the sinews of war for Washington and then died in a debtors' prison, has done more or made greater sacrifices than Mr. Pinchot. Though for the present he has lost his position, he is yet a king, independent of throne or crown. Few men have shown such a fearless persistence in the face of the most determined opposition. There were thousands of men who had pet plans for the future. They wished to put their hands on the nation's wealth. Little cared they for the future. Cattle men and sheep men, who for years had been allowed to ruin young forests and destroy pastures by over-grazing, rose in arms. And what a clamor they raised!

There were no ways of fighting fires. The cattle men wanted fires. Some of the cowboys had it worked down to a fine art. Here was a tract they wanted burned. They might be caught. One takes a magnifying glass and sets it so the focused rays next day would light on dry leaves and other combustibles. The sun does its work, and the innocent cowboy proves an alibi, for he is fifty miles away. I met a range rider in the Rockies and had a long talk with him. He would say to stock owners: "You can put only so many head on this range, and you must pay for it." "Not much," was the answer. "We have had this range, and we are going to have it." He would tell them: "I represent the United States government. You cannot afford to have a war with 90,000,000 people." Often his life was

threatened. All manner of trumped-up charges were sent on to Washington, and sometimes he had to face fire both front and rear. But those heroic men, like the mounted police of Canada, have convinced the ranchmen there is a law in the land, and it must be obeyed.

In a terrible time like this, when most of our northwestern forests are tinder-boxes, what could be done without our range riders and their system of fighting fires? Sometimes they are at it for forty-eight hours without a let-up. One man found two of them lying on the ground in the deep sleep of utter exhaustion. They lay as they had fallen, and the ants were running over them. Perhaps these men take a little relaxation, and then the cry goes up: "See those lazy fellows, and the waste in the Forest Service." No figuring, you understand, of the waste of the fires and the ax. All manner of abuse was heaped on the chief forester, but there was a vision before him, a vision of ruin and desolation, and he wrote, talked, and pleaded, till the tide turned and a great victory was won. A crisis came, and issues involving hundreds of millions. The forester broke a piece of red tape, and he must go. No matter that he stands for a great principle. No matter that he has given his means and his life to a great cause. "Just look at that piece of red tape! Can't you see it is broken?" But, thank God, the nation is fully aroused and our forestry system is established.

You can readily see the clashing of interests. Leading men in our Pacific coast cities want the bars thrown down. The future may care for itself. They want the coal to be dug, and the water powers to be exploited, and flocks and herds to have free range. It all makes business, and they want business now. There never yet was a national park laid out or a national forest made but what there was a tremendous protest from this source. When the government made a national forest near Cass Lake, Minn., a howl long and deep went up. When we tried to have a park in the Wet Mountain Valley, and could have got a bill through Congress for

one of the sublimest resorts, Colorado congressmen sat down on it. But slowly and surely, the people are going to rule. This country is going to be saved. Not only conserved, but made more beautiful and attractive.

The rich soil of Nebraska is hungry for trees. In '72 there was not a shrub or tree on the townsite of York. Now it is called the forest city. We have single trees that would make over 1,000 feet of lumber. Timber pays. In scores of instances men have cut \$300 worth of cottonwood lumber per acre, besides the firewood which was enough to cover the cost. The land was left all the better because it was subsoiled by those vigorous roots.

The side hills must and will be defended from erosion and washing. You see farms with deep gullies ploughed through the cornfield; too deep, almost, to get a team across. Sometimes a grain of sense will come to the owner and he will dump in a load of straw, and so stop the wash. One year ago we had a fearful dust storm in the spring, and in some cases entire furrows on the hills were blown away. In one instance the rich soil of a neighbor drifted three feet deep on one of my hedges. I told him I wished he would lariat his farm and keep it at home. Groves and windbreaks are needed to stop the fierce gales which for ages have swept over our prairies. Buffer-crops can be sown on the long, sloping side hills. I once saw in the Republican Valley a large field of alfalfa which was catching the wash from the long slopes above it. The time will come when instead of the man moving his barn to get it away from the manure pile, he will get a spreader and put it on his farm. The man who feeds cattle will learn sooner or later that corn that is fed manure is worth a small gold mine, and that it will pay to save.

People are waking up to their possibilities. The boys of the future are

going to show their fathers how things will be done and that farming will pay. Two boys in North Carolina raised 125 bushels of corn per acre, where their neighbors were raising twelve. A boy near West Point, last year, raised 114 bushels, where the neighboring men were getting forty. Never yet has an acre of rich land west of the Missouri River been put to its best. The possibilities of our state are astounding. The time will come sooner or later when more will be raised on forty acres than the present system gets from 100.

The roots of corn have been known to go down six feet where they had a chance, yet you see men ploughing three inches deep for corn. The side hills will not always be planted to corn, which gives such a chance for washing. They will be planted to trees, which will be mulched with straw, or else sown to grass, which will be well manured.

The strangest thing is that men will not plant trees. There are millions of acres that are sometimes subject to overflow which for thirty years have raised nothing but weeds and which might be put to raising houses, barns, and wood-piles. Better restore the old woodshed, and raise your own fuel, and give the coal barons the go-by. A farm is an empire in itself. If the farmer raises everything he needs he will grow rich. The nation whose imports exceed the exports is growing poor. For the last few years the balance of trade has been in our favor. The past year we were about \$150,000,000 short, and if this keeps up we shall have trouble. The farmer who buys more than he sells will soon raise a big crop of mortgages. True conservation makes us work the land to advantage and save it as one of God's best gifts to man. So stand up for Nebraska and make it one of the most brilliant stars in our national constellation.



THE CABINET WOODS OF THE FUTURE

By C. D. MELL, Assistant Dendrologist, Forest Service

WHERE shall we look for new cabinet woods? This is an inquiry very frequently made by those concerned in wood using industries. Comparatively few of the foreign woods now in common use are of recent introduction. A number of the important and well-known cabinet timbers have been so extensively exploited that they are becoming scarce or are difficult of access. The cost of felling, transporting, and other handling is so high that it greatly militates against their use. Among such woods are mahogany, cedar, rosewood, ebony, padouk, sabicu, jarrah of West Australia, and scores of others which are less familiar. These woods are so closely associated with certain special uses that manufacturers are exceedingly reluctant to substitute other woods for fear that customers would regard them as inferior. Importers are attempting to bring into prominence some of the excellent cabinet timbers of India, Africa, Australia, Philippine Islands, and Central and South America, for there are many in these countries that are equal both in beauty and in quality to the best now in use. For example, a great many South American trees yield timbers with remarkable firmness of texture, exquisite coloration, durability, and good weight. The same can be said of many West Indian and Central American woods not yet exploited to any great extent. Among the several hundred timber trees of Costa Rica, San Salvador, and Panama, there are at least forty that yield high-class cabinet woods.

A few of the well-known and highly esteemed sorts, like the sabicu of the West Indies and sapodilla and Spanish cedar of Mexico and Central America,

are now becoming rapidly exhausted, and the prices are consequently high. In certain parts of these countries, there are trees yielding timber that can be substituted and utilized to equal advantage. Lower priced woods are often equally well suited for certain special purposes for which some of the higher priced sorts are now almost exclusively used. It is hoped that this fact, to which further attention will be called later in this article, will aid in removing the prevailing notion that certain woods are the only ones suitable for the manufacture of certain articles of furniture, and may help toward the introduction of new woods with substantially similar or even superior properties.

One of the best known woods in the world is mahogany, *Swietenia mahoganii* Jacq. It is naturally confined to the Western Hemisphere, where its range is comparatively small, though by planting its distribution has been extended to southern Asia and tropical Africa. This timber has been cut down for several hundred years with a recklessness that is as prodigal and wasteful as that which has characterized the lumbering of some of our own timbers. There is a constantly increasing demand for mahogany, and the exhaustion of this noble tree is not far distant. Within a comparatively few years the mahogany trade with Central and South America will be a thing of the past.

In asking, now, what the possibilities are for the introduction of woods suitable as substitutes for mahogany we enter into a many-sided inquiry. There is, of course, an enormous disproportion between the total number of woods that will be offered as substitutes for mahogany by importers and the number

actually suitable as substitutes. At one time the American birch was often palmed off upon the unsuspecting purchaser. This wood, however, is only likely to be mistaken for mahogany after it has been carefully stained and polished. Other native woods occasionally substituted are cherry, mountain mahogany, *Cercocarpus ledifolius* Nutt., and loblolly bay, *Gordonia lasianthus* (Linn.) Ellis. Importers have tried to palm off a great many other woods from all over the world. Among them are several species of *Cedrela*, to which belongs Spanish cedar, more commonly known as cigar box cedar, so easily recognized by its characteristic odor. Although cedars are as a rule somewhat lighter in weight than mahogany, it is often difficult to tell them apart, even for experts. *Cedrela fissilis* Vell., and *Cedrela guianensis* A. Juss., from Central and South America, are high-class woods. *Cedrela toona* Roxb., from the Philippine Islands, Sumatra, and southern Asia, is highly esteemed as a wood suitable for furniture and interior finish, and could be used in place of mahogany with very little cause for complaint on the part of purchasers. There are other woods belonging to the same family (Meliaceæ) as the true mahogany, that resemble it even more than those of the genus *Cedrela*. Three African species generally known among lumber dealers as African mahoganies are *Khaya senegalensis* A. Juss., *K. grandiflora* Stapf, and *K. purchii* Stapf, which resemble the true mahogany so closely that it often requires an expert to tell them apart. Other genera of this family, such as *Trichilia*, *Guarea*, *Soymida*, *Entandrophragma*, and *Carpapa*, yield timbers that are difficult to distinguish from the true mahogany. These genera have representatives growing in the tropics and a number of them have been but little exploited.

The timbers of several African species of *Trichilia* and *Guarea* are now extensively exported under the comprehensive trade names of African cedar or African mahogany. There are several species of *Guarea* in Central

America which yield timber locally esteemed for purposes similar to that for which mahogany is used.

The wood of a number of species of *Eucalyptus* has been used in place of mahogany, especially in the form of veneer, for it can be handled most advantageously in this condition when it is to be used for furniture. When the woods of certain species of *Eucalyptus* are carefully stained and highly polished they present a very pleasing appearance and resemble mahogany very closely.

From India, Burma, and the Philippine Islands are imported the woods of several species of *Pterocarpus*, which are often called mahogany, and frequently sold as such. These woods are darker red, heavier, and coarser grained than mahogany, and are less likely to furnish suitable substitutes. Probably the most recent attempt on the part of an importer was to place on the market a so-called Colombian mahogany, botanically known as *Cariniania pyriformis* Miers, a member of the order *Lecythidaceæ*. Although this wood possesses characters almost exactly like those of true mahogany, the two species are not closely related, but belong to two entirely different families.

The wood known as Coccobola, commonly used for making knife handles, is obtained from one or more species of the genus *Lecythis* imported from Central America. The wood is now becoming scarce, but manufacturers have become so accustomed to a wood of this description that they are looking for another kind with similar properties, namely, a hard, dark red wood that may be given a beautiful polish. There are a number that would serve the purpose equally as well as Coccobola. Chief among such substitutes may be mentioned several varieties of *Eucalyptus*, *Diospyros* (ebony), *Dalbergia* (rosewood), *Jacaranda*, and *Machærium* (known also as rosewoods), *Casalpina* (Brazil), *Pterocarpus* (variously known as barwood, camwood, or santalwood),

and woods of numerous other genera. The choice of these depends upon the natural color of wood desired.

It is true that certain articles require wood of varied characteristics, but the requisites of the woods used for furniture need not be so defined and restricted that only a few on the market can come within the scope of requirements. This is quite different, however, when it comes to woods used for the production of dyes, odors, flavors, tannins, resins, oils, and medicinal substances.

What new cabinet material can be confidently sought for? In his new work entitled "Wood," pp. 85-86 (2d edition), G. S. Boulger enumerates about fifty kinds of foreign timbers that are now used for making furniture. Twelve or more of these come from India, eight from South Africa, ten from Australia, five from New Zealand, eight from tropical America, and still others come from the islands of the Pacific and Indian oceans.

In all, more than one hundred species of Brazilian trees yield high-class cabinet woods that have been but very little exploited. Among the most desirable kinds are as follows:

Acapa-rana, known also as Quina, *Ticorca longiflora* D. C. (Order *Rutaceæ*). Tree, large. Wood, dark colored, hard, and moderately heavy, firm, and highly valued for interior and exterior work, as well as for civil and naval construction.

Accende candeira, *Cassia biflora* Linn. (Order *Leguminosæ*.) Tree, average size. Wood, dark colored, hard, heavy, fine grained, and highly valued for cabinet work; also used for small articles, such as walking canes, mallets, and parquetry work.

Amarellinho da serra, *Galipea simplicifolia* Engl. (Order *Rutaceæ*.) Tree, average size. Wood, pale yellow, very hard, heavy, exceedingly fine and close grained, and very smooth when polished. Used for cabinet work and for building.

Amoreira amarela, *Chlorophora tinctoria* Gaud. (Order *Moraceæ*.) Tree, about fifty feet high and from one to

two feet in diameter. Wood, yellow, hard, moderately heavy, and takes a good polish. Used for cabinet work and for spokes of carriages and wagon wheels and wherever strength and resistance are required. Logs are exported to England, where a yellow dye is extracted.

Andiroba, known also as Crabwood, Caraba, and Carapo, *Carapa guianensis* Aubl. (Order *Meliaceæ*.) Tree, from sixty to 120 feet high, and often six feet in diameter. Wood, reddish brown, resembles mahogany, straight grained, moderately heavy, hard, taking a good polish. Used for building and for furniture.

Angelim, known also as Cabbage tree, *Andira inermis* Kunth. (Order *Leguminosæ*.) Tree, usually dwarfed, thirty to forty feet high, and sometimes six feet in diameter. Wood, reddish brown, hard, very durable, and takes a very beautiful polish. Found in the northern and central parts of Brazil. Under the name *Angelina* several other species are recognized by reason of their firm and hard woods. They are used for building and for naval construction, as well as for furniture, parquetry, and turnery.

Angico, known also as Angica vermelho, *Piptadenia rigida* Benth. (Order *Leguminosæ*.) Tree, forty to fifty feet high, and sometimes two feet in diameter. Wood, reddish brown, hard, moderately heavy, fine grained, and taking a beautiful polish. Used for building, and especially for cabinet work.

Anhauina, *Aiouea densiflora* Nees. (Order *Lauraceæ*.) Tree, average size. Wood, fragrant, usually light brown, hard, close grained, and taking a beautiful polish, especially that of the dark colored varieties. Used for building, naval construction, and cabinet work.

Araroba, *Centrolobium robustum* Mart. (Order *Leguminosæ*.) Tree, forty to fifty feet high, and from one to three feet in diameter. Wood, reddish brown, moderately light in weight, fine and straight grained, soft for cut-

ting, and has closed pores. Used for cabinet and inlaid work. A beautiful red coloring matter is extracted from the wood.

Balsamo or Catholico, *Myrospermum* sp. (Order *Leguminosæ*.) Tree, dark brown, resembling mahogany, very hard, heavy, and very close grained. Used for ornamental objects, cabinet work, turnery, and parquetry. One of the species of *Myrospermum* yields the Balsam of Peru.

Barbatimao, *Stryphnodendron barbatimam* Mart. (Order *Leguminosæ*.) Tree, small, rare, but occurs in all the provinces situated north of the Rio de Janeiro. Wood, grayish brown, moderately hard, very durable and beautiful. Used for cabinet work and turnery. *S. guianense* Benth., native to the Guianas, yields the Hoo-booballi wood, also suitable for cabinet work.

Bicuhyba, or Bicoiba, *Myristica bicuhyba* Schott. (Order *Myristicaceæ*.) Tree, tall. Wood, light brown, with darker streaks, moderately hard, tough, rather light in weight, and very durable. This wood remotely resembles mahogany. Used for coffins, building, and cabinet work.

Brazil-wood or Brazilletto, *Cæsalpina brasiliensis* Sw. (Order *Leguminosæ*.) Tree, average size. Wood, light red, very hard, heavy, and close grained. It contains bright red coloring matter, which is often extracted for commercial purposes. Used for violin bows and for small articles of furniture, turnery, and parquetry. The available supply of this wood is now almost exhausted, and consequently it is high priced.

Brazil, *Cæsalpina echinata* Laur. (Order *Leguminosæ*.) Tree, forty to fifty feet high, and from one to two feet in diameter. Wood, well known for its use in making dyes; also used for inlaid work and for making small articles of furniture. It is now becoming very rare. Other dye woods are now being substituted, and the remaining trees are often cut down for use as fence posts and other purposes requiring strength and durability. It is also known as Peach wood, Lima, Nicaraqua, and Pernambuco wood. In British Guiana

it is called Bresil de St. Martha. The wood of this species is inferior to Brazil-wood, *Cæsalpina brasiliensis* Sw.

Cabui vinhatico, *Enterolobium latescens* Mart. (Order *Leguminosæ*.) Tree, from sixty to eighty feet high, and from two to four feet in diameter. Wood, light brown, soft, with large open pores and not strong. Used for building, naval construction, and cabinet work. The wood is very durable and light in weight, and therefore very valuable for making small boats.

Cajueiro bravo, *Curatella americana* Linn. (Order *Dilleniaceæ*.) Tree, ordinary dimensions. Wood, hard, moderately heavy, and usually curly, which renders it very desirable for cabinet work. It is also used for general construction purposes. The rough leaves of this tree are used extensively for polishing.

Cumussin, *Carapa grandifolia* Mart. (Order *Meliaceæ*.) Tree, sixty to seventy feet high, and one to three feet in diameter. Wood, reddish brown, with lighter colored veins, moderately heavy, hard, and straight grained, resembling mahogany. Used for building and naval construction, and especially suitable for cabinet work.

Candeia, *Lychnophora ericoides* Mart. (Order *Compositæ*.) Tree, usually small. Wood, white, rather hard, close and straight grained, taking a beautiful polish. Used for cabinet work and turnery.

Carnaüba, known also as the Wax palm of Brazil, *Copernicia cerifera* Mart. (Order *Palmæ*.) Palm noted for the uses made of it. Besides the wood, used in cabinet work and ebonizing, it furnishes gum used for wax, oil, vinegar, salts (still little known), and starch. The wax yielded by this tree is used on graphophone cylinders. The fibers are used for making cords, nets, and baskets.

Cedro, *Cedrela fissilis* Vell. (Order *Meliaceæ*.) Beautiful tree of remarkable size; the trunk is sometimes ten feet or more in diameter. Found in all the provinces north of the Rio de Janeiro and especially in the valley of the Amazon, where it attains great di-

mensions. Large, fine planks are obtained from it. The wood, which resembles Spanish cedar, is also used for making cigar boxes, turned articles, images, and furniture. It is becoming so depleted that it is used now only for boxes for the very best cigars.

Cumuru, known also as Tonga bean, Gaiac, Cuamara, and Tonquin bean, *Dipterix odorata* Aubl. (Order *Leguminosæ*.) Tree, thirty to forty feet high, and about three feet in diameter. Wood, dark brown, with a greenish-yellow coloring matter in the pores; very heavy, hard, rough, and exceedingly cross-grained. It is durable and employed for purposes requiring strength and stiffness. Used for building purposes and, in the form of veneer, for cabinet work.

Cumary or Cuyumary, *Ay dendron cuyumary* Nees. (Order *Lauraceæ*.) Tree, tall. Wood, brown, light in weight, rather soft, not very durable, and easily worked. Used for building, naval construction, and cabinet work.

Gitahy, *Hymenæa* sp. (Order *Leguminosæ*.) Tree, tall. Wood, yellowish, fine grained, beautiful, very tough and firm. Used for building, wheel-felloes, cabinet work and parquetry.

Grama ruiva, *Machærium brasiliense* Vog. (Order *Leguminosæ*.) Tree, medium height. Wood, dark, sometimes tinged with red; compact, heavy, and resembles the wood of some species of Jacaranda. It has a very fine and even grain, rendering it very desirable for ornamental cabinet work, especially pianoforte cases, turnery, and inlaid work.

Guarabu, *Peltogyne guarubu* Fr., and Guarabu amarello or Pao Roxo, *Peltogyne confertiflora* Bth. (Order *Leguminosæ*.) Tree, tall. Wood, dark purple, hard, heavy, and fine grained. Used for building, naval construction, and cabinet work. The wood imported into the United States under the name of Amaranth is obtained from a species of this genus.

Guarabu preto, *Astronium concinnum* Schott. (Order *Anacardiaceæ*.) Tree, tall. Wood, dark brown, very hard, heavy, close and fine grained, tak-

ing a beautiful polish. Used for building, naval construction, and cabinet work.

Guarajubeira, *Terminalia acuminata* Mart. (Order *Combretaceæ*.) Tree, average size. Wood, light brown, very hard, heavy, and very close grained. Used for cabinet work.

Jacaranda preto, *Machærium legale* Benth. (Order *Leguminosæ*.) Tree, seventy to eighty feet high, and two to three feet in diameter. Wood, usually with dark reddish tinge; one of the most compact and hardest woods known and much in demand for building, cabinet work, inlaid work, and turned articles. This name is applied to several entirely different woods, chief of which is *Dalbergia nigra* Allem., a tree belonging to the same section of leguminous plants. Jacaranda is a general term that applies to the following species: *Machærium firmum* Benth., *M. legale* Benth., and *M. incorruptible* Allem., which are all large, useful trees. On account of this confusion of names, the wood of these trees is often palmed off on the market for the true rosewood of British Guiana. One other species of this genus from British Guiana is *M. schomburgkii* Benth., and produces the beautiful mottled wood called Itaka, Itiki, or Tiger wood, used extensively for furniture.

Jacare-catinga, *Myrica leucadendron* D. C. (Order *Myricaceæ*.) Tree, rather small. Wood, grayish-brown, hard, heavy, and easily worked. Used for building and cabinet work.

Jacariuba, *Calophyllum brasiliense* Camb. (Order *Guttiferæ*.) Tree, ninety to 120 feet high, and trunk sometimes nine feet in diameter. Wood, usually reddish brown, soft, rather light, fine grained, and taking a good polish. Used for building, naval construction, and cabinet work.

Louro abacate or aquacate, *Persea gratissima* Gärttn. (Order *Lauraceæ*.) Tree, tall. Wood, dark brown or reddish, very handsome, resembling mahogany, moderately hard, heavy, and easily worked. Used for building, naval

construction, and cabinet work. The tree produces a savory fruit known in commerce under the name of vegetable marrow.

Louro amarello, Louro vermelho, or Louro commun, *Persea splendens* Meissn. (Order *Lauraceæ*). Tree, tall. Wood, somewhat similar to the preceding. Used for building, naval construction, interior and exterior decoration, according to the qualities of the different varieties. Excellent planks and fine furniture are also made from it. Grows throughout the greater portion of the northern provinces, but especially in the dry districts of the Amazon Valley.

Louro cheirosa, Louro cheirosa canella, Louro cheirosa cravo, or Louro cheirosa pimenta, *Dicypellium caryophyllatum* Nees. (Order *Lauraceæ*.) Tree, large, with straight, clear bole. Wood, pale yellow, hard, compact, and straight grained, durable, and easily worked. It is also known as Sassafras, Pepper-wood, Licari, and Cayenne rose-wood. It is an excellent wood. Used for building, naval construction, cabinet work, and also for industrial purposes. Woods of this genus are fragrant, and yield on distillation the essential oil known as "essence de roses."

Macucu, *Macoubea guianensis* Aubl. (*Inc. Sed.*) Tree, about sixty feet high and nearly three feet in diameter. Wood, light brown, hard, heavy, and fine grained. Used for building, interior decoration, and cabinet work.

Mairapinima, *Centrolobium parense* Jul. (Order *Leguminosæ*.) Tree, medium height. Wood, probably the most beautiful in Brazil. It is light brown, moderately heavy and dense, and is used for carpentry, inlaid work, and furniture. It grows in the upper districts of the Amazon region.

Marupa, known also as Simarouba and Acajou blanc, *Simaruba amara* Aubl. (Order *Simarubaceæ*.) Tree, very large. Wood, almost white, resembling white pine, moderately hard and heavy. Used for building, exterior decoration, and cabinet work.

Massaranduba, *Mimusops elata* Fr. All. (Order *Sapotaceæ*.) Tree, eighty to ninety feet high, and from six to

ten feet in diameter. Wood, very dark brown or nearly black, and one of the hardest known. Used in buildings and carpentry. It is one of the most valuable of all trees.

Pao amarello, *Vochysia obscura* Warm. (Order *Vochysiaceæ*.) Tree, fifty to sixty feet high, and about three feet in diameter. Wood, sometimes nearly white, hard, moderately heavy, and close grained. Used for building, naval construction, and carpentry. The useful timber copai-ye-wood of Guiana is derived from *Vochysia guianensis* Aubl.

Pao d'arco, known also as white cedar, Cogwood, and Roble blanco, *Tecoma pentaphylla* Juss. (Order *Bignoniaceæ*.) Tree, sixty to 100 feet high, and from eight to ten feet in diameter. Wood, yellowish or sometimes very light brown, hard, compact, even grained, and elastic. Used for building, naval construction, and cabinet work.

Pao santo or Pao preto, *Kielmeyera* Nees. (Order *Lauraceæ*.) Tree, medium height. Wood, dark brown, compact, hard, moderately heavy, fragrant, and beautiful in grain. Used for building and valuable for cabinet work; also used in perfumery.

Pao santo or Pao preto, *Kielmeyera excelsa* Camb. (Order *Ternstræmiaceæ*.) Tree, large dimensions, the bole being more than three feet in diameter. Wood, dark, very hard, and very dense. It is considered one of the best in Northern Brazil on account of its numerous uses for interior decorations, cabinet work, and hydraulic construction.

Pao violeta, *Machærium violaceum* Vog. (Order *Leguminosæ*.) Tree, tall, and two to three feet in diameter. Wood, hard, compact, and of a beautiful light violet color. Used for fine cabinet and inlaid work.

Pao de tanho branco, *Aspidosperma eburneum* Allem. (Order *Apocynaceæ*.) Tree, tall. Wood, moderately hard, heavy, very smooth, and fine grained, somewhat resembling mahogany. Used for building, interior decoration, and furniture.

Paparauba, *Simaruba versicolor* A. St. Hil. (Order *Simarubaceæ*.) Tree, sixty to eighty feet high, and about three feet in diameter. Wood, white, rather soft, and works very easily. Used in civil and naval construction and for cabinet work.

Paracauba, or Angelim vermelho, *Andira fraxinifolia* Benth. (Order *Leguminosæ*.) Tree, forty to sixty feet high, and three feet in diameter. Wood, reddish, hard, heavy, usually cross grained, and takes a beautiful polish. Used for civil and naval construction and for cabinet work.

Perôba do campo, *Sweetia elegans* Benth. (Order *Leguminosæ*.) Tree, large, eighty to 100 feet in height, and sometimes four feet in diameter. Wood, varies from a light yellowish to a pinkish hue; the heartwood is sometimes quite red, pinkish, or flesh colored. It is hard, moderately heavy, exceedingly fine grained, and takes a beautiful polish. Used for interior finish, construction timber, and also for furniture, for which it is highly esteemed.

Rabugem or Roble, *Platymiscium blancheti* Benth. (Order *Leguminosæ*.) Tree, sometimes 100 feet high and three to four feet in diameter. Wood, hard, heavy, tough, and beautiful in grain. Used for building and cabinet work.

Tambor, *Macarobium vaupa* F. Gmel. (Order *Leguminosæ*.) Tree, tall. Wood, hard, heavy, and tough, taking a very good polish. Used for manufacturing wheels and cylinders for sugar machines, and for cabinet work.

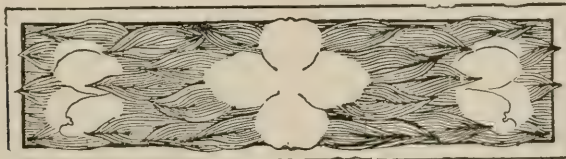
Tamboril, known as Corotu in Panama, *Enterolobium timbouva* var. *Ca-*

nescens Engl. (Order *Leguminosæ*.) Tree, among the most gigantic, attaining a height of ninety to 130 feet, and a diameter of nearly ten feet. Wood, light brown, rather soft, and quite porous, not strong, but durable, and remotely resembling mahogany. Used for building, interior decoration, furniture, and boat building. Small vessels of twelve tons burden have been made out of a single log of this tree.

Tinguaciba, *Xanthoxylon spinosum* Sw. (Order *Rutaceæ*.) Tree, average size. Wood, yellow, hard, heavy, and fine grained, taking a good polish. Used for building and cabinet work.

Uxi, *Couepia myrtifolia* Benth. (Order *Rosaceæ*.) Tree, about fifty feet high and more than three feet in diameter. Wood, hard, heavy, and fine grained, taking a beautiful polish. Used for construction timber and cabinet work.

These names, of but little significance when pronounced in passing, are given merely to emphasize the fact that the kinds of woods useful for making furniture are exceedingly diverse. Constant effort is put forth by importers of foreign woods not only to select the best kinds, but also to search for and discover new woods of which little or nothing is known. South American countries will probably supply the bulk of our cabinet woods in the very near future. Transportation facilities are being speedily developed there, and capital from the United States is pouring in, thus developing natural resources with amazing rapidity.



WHERE FORESTRY CAN BE STUDIED

A FEW years ago the prospective American student of forestry had little choice in his own country of the place where he would study. The first forestry school was opened at Biltmore, North Carolina, thirteen years ago; a little later the Yale Forest School was established, and for a while they stood almost alone. Now there are several schools well manned and equipped to give instruction in forestry of the highest grade, and numerous others are giving a course or courses in this subject. Two colleges, Tufts College in Massachusetts, and the University of California, announce special forestry preparatory courses, made up in great measure of the fundamental sciences on which forestry rests.

The subject is too new in our curricula to be fully standardized and the efforts of many institutions to meet the need are somewhat experimental, but it is nevertheless clear that forestry has won its place in the consideration of our educational authorities.

For the information of those interested a list is published of universities, colleges, and schools in the United States where forestry is taught. Brief statements of the nature and scope of the work done are added to each case. This information has been gotten from the published announcements of the institutions themselves and an effort has been made to make it as accurate and complete as possible. AMERICAN FORESTRY will be grateful for any correction or additions, now or in the future, so that accurate information may be available at all times to its readers and friends.

GRADUATE SCHOOLS

There are three graduate schools offering to college graduates the highest grade of professional training and

fitting their students for the best places in the profession. They are departments of three of our oldest universities. Each of these schools is thoroughly equipped and has demonstration forests and access for practice work to private or state-owned forest lands.

Yale University, New Haven, Connecticut, Yale Forest School (founded in 1900). A graduate department requiring for admission a college training. A two years course leading to the degree of Master of Forestry. An undergraduate preparatory course is given in the Sheffield Scientific School.

University of Michigan, Ann Arbor, Course in Forestry (founded in 1901). A graduate course leading to the degree of Master of Science in Forestry. Undergraduates in the University who pursue a course leading to forestry may take the degree of Bachelor of Arts at the end of the fourth year and the degree of Master of Science in Forestry at the end of the fifth year. For those who begin the study of forestry after graduation the course is two years. Work in forestry for the doctorate of science or of philosophy is also open.

Harvard University, Cambridge, Massachusetts, Division of Forestry, School of Applied Science. Open to graduates of a college or scientific school of good standing. A two years course leading to the degree of Master in Forestry.

Two universities have recently organized colleges of forestry on coordinate lines with the other departments, providing for undergraduate as well as graduate work.

University of Minnesota, Minneapolis, College of Forestry. A four years undergraduate course leading to the degree of Bachelor of Science in Forestry; entrance requirements, those of the university. Also a graduate course of not less than one year leading to the degree of Master of Forestry. The degree of Doctor of Science may also be obtained by bachelors of this or any other forestry college of equal grade within not less than three years after graduation under conditions prescribed by the faculty of the graduate school.

University of Washington, Seattle, School of Forestry (established 1907). A four years' course leading to the degree of Bachelor of Science in Forestry. Also a two years graduate course leading to the de-

gree of master of Science in Forestry. This school has a good equipment, the nucleus of a forest museum, and is in the heart of a great timber country near extensive national forests.

UNDERGRADUATE COLLEGE COURSES

A number of colleges, especially the land grant institutions, have instituted undergraduate forestry courses of four years. The facilities of these institutions vary considerably and the courses are not standardized as yet, but they represent useful beginnings and provide opportunities for forestry study for many who cannot meet the requirements of the higher schools. Some of them are well equipped and have competent instructors.

Colorado College, Colorado Springs. School of Forestry (established 1905). A four years course leading to the degree of Forest Engineer, and a graduate course of one year leading to the degree of Master of Forestry. Has a demonstration forest of 13,000 acres and is near the natural forests. There is a summer course and a special twelve weeks' course for forest rangers and guards.

Colorado Agricultural College, Fort Collins. The four years courses in the division of agriculture differentiate in the junior year, and for the course in forestry the junior and senior years are given to technical subjects. The degree is Bachelor of Science.

University of Georgia, Athens, College of Agriculture. School of Forestry. A four years degree course and a summer course.

University of Idaho, Moscow. A four years course leading to the degree of Bachelor of Science in Forestry. Has good equipment and demonstration forest of 640 acres.

Purdue University, Lafayette, Indiana. Arranged as one of the four years courses in science leading to the degree of Bachelor of Science. The forestry course are classified under the department of biology.

Iowa State College, Ames. Department of Horticulture and Forestry. Special attention is given to farm forestry under Iowa conditions. A mixed course, not to be regarded as a technical course in forestry.

University of Maine, Orono. A complete undergraduate course in forestry is arranged, which may serve as the basis not only of practical work in forestry, but also of a liberal education. A knowledge of the principles of forestry in its different branches is given to the student, and some practical

work is done in the forest. Degree of Bachelor of Science.

Michigan Agricultural College, East Lansing. Forestry course (established 1902). Four years course, the work of the freshman and sophomore years practically the same as for agricultural students; strictly technical work begins in junior year. Degree of Bachelor of Science.

University of Montana, Missoula. Four years course leading to degree of Bachelor of Science. "The courses of study as at present outlined are designed to prepare students in the fundamental subjects of forestry. From one to two years of graduate work will be necessary for those desiring to become professional foresters." There is a short course for forest rangers in January, February and March. The location in Missoula of the headquarters of District No. 1 of the United States Forest Service is noted as one of the advantages of this institution.

University of Nebraska, College of Agriculture. A four years course leading to the degree of Bachelor of Science. For a fifth year of approved work the degree of Master of Forestry may be obtained.

Oregon Agricultural College, Corvallis. "To meet the needs of the State in conservation and development of its forest resources, the College has provided a regular course of four years, which will be supplemented with a winter short course." Degree of Bachelor of Science in Forestry.

Pennsylvania State College, State College. "The course in forestry is planned to give students a thorough and practical training, so that upon graduation they may take up professional forest work." Degree of Bachelor of Science for four years course.

State College of Washington, Pullman. This college announces a four years course in forestry leading to the degree of Bachelor of Science.

In a class by itself because of its organization, methods, and purposes, is the unattached

Biltmore Forest School. This is a school of "purely technical forestry," now in its thirteenth year. The course of one year, supplemented by six months of practical work, leads to the degree of Bachelor of Forestry. After two years experience and the presentation of a thesis a Bachelor of Forestry may receive the degree of Forest Engineer. The school holds a winter session in Germany, a spring session in Adirondacks and southern Appalachians, and during the autumn months in the Lake States.

FORESTRY ONE SUBJECT IN COURSE

The following colleges and universities give one or more courses in fores-

try. It should be noted that these can in no case be considered training for the profession of forestry. They are at best partial and elementary, giving such knowledge as may be considered properly a part of a general education, and particularly of agricultural education. In most cases they are designed for the latter purpose.

Alabama Polytechnic Institute, Auburn. A one term course in the senior year in the department of agricultural sciences on forest conditions of Alabama and care of woodlots.

Connecticut Agricultural College, Storrs. A course in the spring term "to give students an idea of practical forestry in Connecticut."

Delaware College, Newark. A course dealing with the elements of forestry in the agricultural course, second term, senior year.

Kansas State Agricultural College, Manhattan. Two junior courses—one in farm forestry and one in silviculture.

University of Illinois, Urbana. A brief course as an elective.

Berea College, Berea, Kentucky. Course on fundamental principles of forest influences, in the fall term.

Maryland Agricultural College, College Park. Elementary forestry in the sub-freshman year; farm forestry in the senior year, and wood technology in the second term of senior year.

Massachusetts Agricultural College, Amherst. This college has had since 1905 a short course of lectures by the State forester. It has secured this year an assistant professor of forestry and a course is planned covering silviculture, dendrology, forest mensuration and nursery practice the first year, and forest management, lumbering, technology, and handling of woodlots the second year.

Mississippi Agricultural and Mechanical College, Agricultural College. Single term courses in farm forestry, silviculture, and forest policy.

University of Missouri, Columbia. Courses on principles of forestry and introduction to forestry. This university is now establishing a department of forestry and intends to develop a strong course leading to a forestry degree.

University of Nevada, Reno. One-term course in elementary forestry, primarily for the junior colleges.

New Hampshire College, Durham. One-term courses in principles of forestry, forest technology, systematic arboriculture, and forest nursery management, the first required, the others elective for students in the full agricultural course. Also a one-term

course in farm forestry for students in the two years agricultural course.

North Dakota Agricultural College, Fargo. A course in the spring term of six weeks, devoted chiefly to North Dakota conditions.

Oklahoma Agricultural and Mechanical College, Stillwater. A one-term course devoted chiefly to planting and care of trees in Oklahoma.

Rhode Island State College, Kingston. A one-term course on the management of a southern New England woodlot.

Clemson Agricultural College, Clemson, South Carolina. A lecture, field and laboratory course in elements of forestry.

South Dakota State College of Agriculture and Mechanic Arts, Brookings. A one-term course in the principles of forestry.

University of Tennessee, Knoxville. A one-term course in principles of forestry.

Agricultural College of Utah, Logan. The United States Forest Service and the college offer conjointly a winter course for forest rangers.

University of Vermont, Burlington. An elective course, "not intended to make foresters, but to give students a working knowledge of forestry such as is needed by the farmer and lumberman, and to enable them to decide whether they wish to pursue the study at a forest school."

Middlebury College, Middlebury, Vermont. A one-term elective on general principles. President Thomas says: "We have not in mind, of course, the adequate training of young men as foresters, but a fitting introduction to technical studies and an attempt to show the practical application of previous studies in botany. It is our hope that we may be able to do much more in the future in the way of practical instruction in forestry."

Hampton Normal and Agricultural Institute, Hampton, Virginia. An elementary course in general principles.

West Virginia University, Morgantown. Offers six half courses in forest botany, elements of silviculture, forest economics, forest technology, forest management, and forest mensuration and survey.

SPECIAL COURSES

University of Wisconsin, Madison. Considering that the field of general higher forestry education in the Lake States is sufficiently covered by the schools of the University of Michigan and Minnesota, this university seek to fill an unoccupied place and avails itself of the opportunity offered by the conjunction of its excellent engineering plant and the United States Forest Products Laboratory to conduct a series of courses in wood technology and wood manufacturing machinery.

Pennsylvania State Forest Academy, Mont Alto. This is a special school to prepare young men for the State Forest Service and vacancies are filled by appointment after competitive examination. Students must complete a three years course and remain in the State service at least three years after graduation.

SECONDARY SCHOOLS

Eric Forest School, Duxbury, Massachusetts. Gives an elementary course in forestry, with either regular high school work or special subjects. Prepares for higher forest schools.

Mount Hermon School, Mount Hermon, Massachusetts. Has as a part of its curriculum a course in the elements of landscape gardening and forestry.

Smith's Agricultural School, Northampton, Massachusetts. "We pay attention to for-

estry and shall do forestry work on our farm for demonstration purposes with our students for the benefit of the public. Our instruction will be primarily the kind that will be the most value to boys that intend to operate their own farms and want to know what are the best forestry methods for their own use."

Crookston School of Agriculture, Crookston, Minnesota. Affiliated with the State University. Teaches farm forestry with reference to the needs of the prairie region in which it is located.

North Dakota School of Forestry, Bottineau. This is a State institution, with an agricultural and industrial course. The school is mis-named, as forestry occupies only a minor place in its course.

Murray State School of Agriculture, Tishomingo, Oklahoma. Forestry occupies its usual place in a school of this class as one subject in an elementary agricultural course.

THE WOODS OF THE PHILIPPINES

So little is known in America of the 400 or more merchantable woods of the Philippine Islands, and so difficult is it even for a wood technologist to identify them, that a recent announcement of the Philippine Bureau of Forestry will doubtless be welcomed by student and timber-user alike. Arrangements have been completed for the general distribution of samples of all of the Philippine woods of any commercial importance, and also of a large number of the rare and little-known species. Each sample is about 4x5 inches and $\frac{3}{8}$ in thickness, with planed surfaces. They can be readily fitted into a case or used as desk specimens, paper-weights, etc. An attached label gives the scientific name and the native name by which the wood is most generally known in the Philippines. Samples from the great bulk of the woods are sold at a nominal cost of 10 cents each (U. S. Currency), but those which are difficult to replace, or whose hardness or toughness of grain makes them rather expensive to saw out, are sold at 20 cents apiece. These latter comprise the following species:

Agoho	Kuyus-kuyus
Anubing	Dungon
Betis	Ebony
Camagap	Alupag

Bansalaguin	Mancono
Bolongeta	Narig
Camuning	Oak
Dalinas	Palo Maria
Dungon-late	Sasalit
Ipil	Tamayuan
Liisin	

All others are sold at 10 cents each. The weight of each sample averages about four ounces, and if they are to be mailed to the United States, 4 cents per sample should be added to the above prices. The post-office money orders should be made payable to the Director of Forestry, Manila, P. I. Stamps will not be accepted.

If the purchaser wishes, he may leave the selection of the samples to the Bureau of Forestry, simply stating the number of samples he desires, and the use to which he wishes to put them, or the class of woods in which he is interested; e. g., for use as school collections, woods for furniture manufacture, etc.

Of course, it is not expected that the mere possession of such samples will make their owner an expert in identifying Philippine woods; but they may often prevent his being imposed upon through either the ignorance or the bad faith of the vendor.

EDITORIAL

The Tasks Set Before Us

THE forestry movement in America has passed its first propagandist stage. The awakening of public interest has come; schools, colleges and universities are taking cognizance of this subject; a national forest service, in which we may take pride, has become a permanent part of the administrative branch of the government; many of the states have established similar departments; we are fast coming to a knowledge of our forest resources, their possibilities and requirements.

In bringing about all this the American Forestry Association, which holds its thirtieth annual meeting in Washington on the twelfth and thirteenth of January has had a large and honorable part. It led the way in the organization of the people to secure these results and its influence, guided steadily by the leaders of the movement, has been potent for good through all these years.

We are facing a new period of real constructive work. Our original thesis—the need of scientific forestry—is conceded among intelligent citizens. The next steps are those of education and of the rounding out of our forest policy, establishing the latter, when the right way has been determined, through well-framed state and national laws.

The first task—that of arousing the people—was not easy. The second is more difficult and demands the application of highly trained effort. But the means are at hand for this. The Forest Service commands the efforts of highly trained specialists, whose work is partly educational as well as administrative. The same is true of the state services in those commonwealths which have progressed so far as to have them. The various associations, national, state

and local need not feel that their work is done. The best is yet before them, but they must not be content with the old methods of agitation and propagandism. They must set before themselves definite tasks, educational and practical. Sound knowledge and wise laws, trained men to administer, and an informed citizenship to support them are what we need now.

The general movement for conservation of natural resources, which is being broadened into a general overhauling of our economic methods, has taken a strong hold upon the country. The details of its application may be criticized by interested persons, but the people believe in it. In this movement because of its broad relationship and because it led the way, forestry occupies a central place.

This is the way the American Forestry Association looks at its work, with its face to the front, preparing for a larger usefulness even than in the past. To the work of education much attention must be directed and in this number of the magazine will be found, we believe, the most complete and authoritative list that has yet been published of the schools, colleges, and universities in the United States that teach forestry in some form. We expect to publish much material of a directly educational character during the coming year.

In addition to such work, we wish to see a rounding out of our national and state forest policy along the broadest lines, so that waste land in this country of ours will be reduced to a minimum and water, soil, and climate preserved by ample and well managed forests under national, state, municipal, and private ownership.

Is not the task sufficient and worth while? Do you not want to share in it?

A Senator's Monologue

AN ARTICLE by Senator Thomas H. Carter, of Montana, appeared in *Leslie's Weekly* for October 27 under the caption "Common Sense and Forest Conservation." It deals particularly with the conditions developed by the recent fires in the national forests, and on account of the prominence of the author and the fact that he comes from a national forest state, it is likely to carry more weight than it merits. It is entirely characteristic of its author in the skill with which certain things are avoided and others are said. With gentle indignation Mr. Carter defends himself and other senators and representatives of his section against the belief that they are hostile to the preservation of the national forests in their states and districts. We shall not undertake to trace the details of the senator's record in Congress in regard to land and forest legislation, but we suggest that before accepting in full his general statement it might be interesting to explore the Congressional Record, although he is one of those whose ulterior thoughts and purposes are not fully revealed by that interesting but sometimes disappointing publication. We recall him in the Sixtieth Congress as one of that distinguished trio, Senators Teller, Heyburn and Carter, who prevented a vote on the Weeks Bill when it came over from the House by threatening to talk out the session. The point of Senator Carter's article is not, however, his own legislative record, but his criticisms of the Forest Service for the use that has been made of its appropriations.

The Senator says that in the "last ten years some \$20,000,000 were placed at the disposal of the Forestry Bureau to prepare for the battle with the flames." This statement is loose and inaccurate, inexcusably so, because the uses to which the appropriations have been put are prescribed by law in each appropriation bill, and their expenditure is duly accounted for in the annual reports of the Forester, printed documents accessible to every American citizen.

In the first place the Forestry Bureau (Forest Service) has not had ten years' appropriations "to prepare for the battle with the flames." The forest reserves now known as national forests were administered by the Interior Department until 1905, when they were transferred to the Department of Agriculture, in order to unify our forest administration. The appropriations that have been available for the use of the bureau which Senator Carter undertakes to criticise, cover therefore only the years 1906, 1907, 1908, 1909, 1910, and the current year, which ends on the 30th of next June. The amount of the total appropriations for all the work of the Forest Service during this period is considerably under twenty million dollars. The element of time is an important one. It takes a considerable period of time, more than five years, even with much larger appropriations than Congress has allowed, to train a numerous body of guards and rangers, make improvements, such as roads, trails, lookouts, and telephone lines and instal equipment on over 160,000,000 acres, much of it the wildest and most inaccessible forest land on the continent.

The Senator from Montana knows that the appropriation bill for the Forest Service, as for other bureaus, fixes first a list of statutory salaries. This part of the bill is definite and unchangeable. Then there is a paragraph devoted to general expenses. This appropriates a lump sum for a great variety of purposes, all of them important, most of them absolutely necessary for carrying out the purposes of the Service. Included in this omnibus paragraph is the clause, "to pay all expenses necessary to protect, administer, and improve the national forests," but in the later appropriation bills there is another specific paragraph providing for "Improvement of National Forests," the appropriation for this purpose for the year ending June 30, 1910, being six hundred thousand dollars. There is an established ruling of the Treasury Department that when a specific provision is thus made it supersedes a general clause, like the first

cited. Hence for the purpose enumerated in the last paragraph—"construction and maintenance of roads, trails, bridges, fire lines, telephone lines, cabins, fences and other permanent improvements necessary for the proper and economical administration, protection, and development of the natural forests"—the Service was restricted to the specific appropriation of six hundred thousand dollars.

Senator Carter knows these things, he has heard the work of the Service discussed, and its needs presented. Has he ever assisted the service to secure a more adequate appropriation for the guarding and improvement of the forests, the need of which he urges in the article to which we refer?

The educational work of the Service costs but a few thousand dollars a year, is limited in scope by legislation, but has accomplished much in enlightening the public on an economic question not generally understood. Yet Senator Carter refers to this work almost contemptuously and implies that it is a useless extravagance and has absorbed very large sums. Has he any objection to having the people enlightened as to their national domain and its proper management? Nothing would show more conclusively the importance and necessity of this kind of work than the state of mind on this subject of the Senator from Montana. If he, charged with legislative responsibility for the interests of government, understands so little the purposes, accomplishments, resources, and needs of this bureau how much must the public generally need information?

The Senator protests his regard for the forestry work of the government and his support of it, yet he advocates putting all of the appropriation into guards and improvements for the national forests; that is, he would support the Service by cutting off its head, making it all legs and arms with no directing mind and nerve centres. He knows perfectly well that a great bureau like this, charged with varied and important scientific investigations and experiments, with the dissemination of accurate knowledge, and with the prac-

tical administration of a vast public domain, must have a great organization, must be a big administrative machine, with all its parts co-ordinated. For this purpose and this work the organization of the Forest Service is none too large or costly. It is, on the other hand, an efficient and economically conducted bureau. There is being built up year by year an operating system and a working force in the national forests of which the nation may well be proud. Its improvement can be hastened by more liberal appropriations.

Why then, this demagogic attempt to show that the modest appropriations for the Forest Service should all have been expended for guards and improvements in the national forests? The Senator knows something of business organization. Does he think the government bureaus can retain their efficiency without it?

Senator Carter cites the German forest system as one we could have emulated to better effect. Does he know anything of the highly developed German organization, of what machinery is required to keep the model system working smoothly, of the training of the forest officers and guards, and of what is required of them as compared with our own? The German national forest system has been the growth of over two centuries of experience, scientific investigation, and its practical application. Our system is less than twenty years old. The present organization has had about five years in which to shape its practice. Germany spends about two dollars an acre on its forests; we spend a little less than two cents.

Since Senator Carter has introduced this little comparison, which seems to us the most unfortunate that he could have made, it seems to be fair to ask if he will assist in providing the funds necessary to attain at the earliest period a like complete and perfect organization here?

Will he assist us to establish national forests in the White Mountains and Southern Appalachians, which Germany

would never allow to be devastated as we are doing?

Save for the position of its author, the article we have been discussing would not be worthy of serious consideration. Careless in statement, disingenuous, disregarding facts accessible to every citizen and which every member of Congress has placed before him in the day's routine, it is the special plea of a politician who is a past master in the art of using language to conceal thought.

Fire Losses and Fire Fighting

THE estimate of the fire losses of the year as given in the November number of *AMERICAN FORESTRY* have been questioned by some excellent authorities. In particular the *American Lumberman* reviews them somewhat at length, and in certain instances throws doubt on them without giving sufficient attention to the context.

We believe these estimates were conservative and were as nearly correct as they could be made at this time. In the very nature of the case estimates of this kind must use figures in a large and general way, and it is always to be remembered that while there is a considerable salvage of burned timber suitable for lumber, this can never equal in value the unburned forest, and some of the largest and most lasting losses from a great forest fire can never be figured in dollars and cents. This is an axiom but it must not be forgotten.

We ask that our statement of what forest fires cost in 1910 be read carefully as it was printed. As regards the total loss in money this magazine reduced all newspaper estimates and based its computations upon the best authorities obtainable. The results were checked by working from known areas and probable stumpage. If the estimate so obtained does not seem correct we invite our critics to work out a better one. Thus far we have seen no attempt in this direction.

In comparing the national and privately owned forest losses we made two distinct statements, in separate paragraphs. The *American Lumberman* runs these together and misapprehends their real significance. In the first of these paragraphs we said: "It is probable that state and private owners suffered more nearly three times than twice as heavily as the nation by these fires," that is the fires in the northwestern states. This referred to absolute losses and not losses in proportion to area. In the next paragraph we broadened the comparison to include the whole country and made this statement: "A comparison of the public losses with the private losses for the whole country indicates that the private losses were seven times greater than the public losses, in spite of the fact that privately owned forests are not more than five times greater in extent and are more accessible than those privately owned." Here again it was absolute and not proportionate losses that were referred to and it must be remembered that privately owned forests outside of the northwestern states have practically no protection. We were not constructing a brief for national ownership but were trying to get at the actual losses sustained by the American people whether in their private or corporate capacity. The *American Lumberman* seems to think that we were trying to show that the government protected its forests seven times better than private owners, which was far from the intent of our thought or the sense of our words. We do say unhesitatingly that the government forests are somewhat better protected than those of the country as a whole, many of the latter having no protection at all.

The government forests are, as we have said, more inaccessible and difficult to protect than most private holdings because they have not been located primarily on account of practicability for profitable lumbering. They have also been inadequately manned, as our forest authorities have constantly maintained, this being due to insufficient appropriations, for which certain senators and representatives from national forest states must bear a considerable share

of responsibility. Nevertheless, the showing of the national forests in the way of fire protection has been good, all things considered, and the national Forest Service led the way and showed the method for state and private protective work which has since been undertaken. If the latter has bettered the teaching, it is because obstructive legislation has held the national service back. Never forget that fact when stones are being thrown at the Forest Service. No better testimony to the leadership of the national service can be given than that of E. T. Allen, forester of the strongest private protective association in the country, the Western Forestry and Conservation Association. His article in the November number may be profitably read in this connection.

Therefore we think the *American Lumberman* put the case too strongly when it said: "Instead of leading, the government is trailing;" but we subscribe cordially to what follows: "The Forest Service has done good work within the limitations set upon it by a Congress which was compelled to trim its appropriations at some point and found the Forest Service a convenient victim." And further: "The principal lesson from the experience of 1910 demonstrates the advisability, the absolute necessity of equipping the Forest Service to protect that great portion of the public wealth which is entrusted to its charge." Our contemporary even goes so far as to hold that if over-estimates will help to arouse public sentiment and loosen the purse strings of Congress "they will serve a useful purpose."

A Haunted Editorial Office

THE Roosevelt specter has made the *New York Times* reactionary on questions in regard to which it has heretofore been sound and sane. A recent editorial charged up the forest fires to the "new nationalism" on the ground that Mr. Pinchot and Mr. Roosevelt had been largely responsible for creating the national forests and that they did not make their "efficient machine" pro-

vide a system of fire protection.

The argument of the *Times* overshoots its mark and returns upon its author. In the first place the fire protection record is far better in the national forests than anywhere else in the country, except in certain limited sections where the lumbermen have banded together and adopted Forest Service methods. In the second place, it has been the failure of the legislative branch of the government, owing to the obstructive tactics of representatives and senators to the national forest policy, that has limited the efficiency of the national protection work by refusing to satisfy manifest needs of the forest service. It pleases Mr. Roosevelt's enemies to represent him as a dictator, but he wasn't by any means. We hold no brief for any person or political theory, having larger work to do, and we suggest that if the *Times* will also clear away political and personal prejudice from its discussions of this subject it will do better.

The Reward of Good Citizenship

THE election of Robert Perkins Bass to the governorship of New Hampshire is a matter of much interest to the country, and especially to readers of this magazine. Mr. Bass came to the front in New Hampshire through his work in behalf of forestry in the state, demonstrating his unselfish citizenship and his thorough efficiency in the reorganization of the State Forestry Commission, of which he became chairman. Last January he was made a director of the American Forestry Association.

Mr. Bass is a young man to have gone so far. He still has long years of usefulness before him, a fact upon which his state and the nation may be congratulated, for he belongs to the type of quiet, efficient, democratic citizens who are needed at the front now and always, men who without self-seeking give of their opportunity to the service of the state. Our readers will be interested in the brief sketch of the public service of Mr. Bass in New Hampshire given on another page by Philip W. Ayres.

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REVIEWS

A MANUAL FOR NORTHERN WOODSMEN.—By Austin Cary, Superintendent of Forests, State of New York, recently Assistant Professor of Forestry in Harvard University, Cambridge. Published by Harvard University, 1910. pp. xii, 250. Price, \$2.00.

This is the second edition of Mr. Cary's manual, the first, published a year ago, having shown that it met a real demand. Since it was published, the author has left the service of New York. The book is like its author, unassuming, business-like, competent. Mr. Cary's long practical experience as a timber cruiser and forest expert in the northern woods, taught him the woodsman's needs. The compact make-up of the book and its serviceable binding with folding flap mark it at once as a field book. It does not deal with theory, but embodies the things the woodsman needs to know and to have at hand in his field practice. A brief statement of its contents is therefore its best review.

Part I deals with land surveying, describing the instruments, their use, and methods of work, both in field and office. Part II covers in the same practical way the making and use of forest maps. Part III covers the important subject of log and wood measurement. All the different rules for cord and board measure are fully explained. This is followed by timber estimating in Part IV, in which we find a description of the instrumental helps, height, measurement, volume tables and tree form; and the practice of timber estimating for small and valuable tracts, and for larger and less valuable tracts by the type and plot, strip, and line and plot systems. The fifth part is given to tables relating to the other parts and to miscellaneous tables and information.

Forest Trees of the Pacific Slope

From the frequent applications to the Forest Service for copies of "Forest Trees of the Pacific Slope," by Dr. George B. Sudworth, Dendrologist of the Forest Service, it does not seem to be generally understood that the limited edition, available for distribution by the Service, has been exhausted. The only way now to procure copies of these books is to send postal money order for 60 cents (stamps and personal checks are not accepted) to the Superintendent of Documents, Government Printing Office, Washington, D. C., from whom they can be obtained at all times.

"Forest Trees of the Pacific Slope" is the first volume on North American forest trees to be published by the Forest Service. In course of time it will be followed by three others, which will deal with the trees of the rest of North America. The "Trees of the Pacific Slope" is the most complete work of its kind so far offered to the general student of forestry, and its price places it within the reach of many students who do not find it convenient to purchase more expensive publications on forestry botany. Dr. Sudworth's book is fully illustrated with natural-size plates.



STATE WORK

Indiana Forestry Association

The Indiana Forestry Association, the organization of which, with the names of the incorporators, was mentioned in these pages last month, has issued an address to the people of the State, signed by the President, former Vice-President Charles W. Fairbanks, and the Secretary, George B. Lockwood. This address is as follows:

Indianapolis, November 14, 1910.

The subject of forestry has come to be one in which the people who give thought to the future welfare of our State are deeply concerned. The rapid denudation of our forests; the consequent impairment of our timber supply; the destruction of our soil over considerable areas; the gradual diminution of our water level—suggest to all public-spirited citizens the necessity of some concerted action to arrest further unnecessary destruction, reclaim the waste places and make provision for forestation so far as it may be practicable. We must not further sin away our day of grace; we must not suit supinely by and see our State further impoverished with respect to one of our richest inheritances. We owe it to ourselves, our children and our State to inaugurate a system of education with regard to our trees and our forests; and adopt measures which shall conserve what we have so far as may be done consistently with our commercial needs, and take steps towards growing trees wherever it can be done to advantage. This is neither the concern nor the work of the few; it is a matter of vital interest to every citizen of the State, and should enlist the earnest co-operation of the many. Our progress will necessarily be slow for a while, but if we go about it in the right spirit and realize that it is a work of the highest public moment, it will nevertheless be sure. The need is at hand and every day's delay will simply increase the difficulty of meeting it later; it is neither the part of economy nor patriotism to further postpone taking up the subject in a broad-minded, scientific way. Procrastination will simply result in intensifying the gravity of the situation and the difficulty of putting the great subject upon a rational, sound basis. Every new tree added to our timber supply, every one saved from ruthless destruction—will be a blessing to the future, a source of health and joy to our people, and wealth to the State—to serve which should be a part of the religion of us all. We should no longer play the part of the spendthrift—utterly heedless of tomorrow.

We regard it of prime importance that the young men and young women of the State

should be educated upon the subject of forestry, and to that end we hope to have the generous co-operation of schools, colleges and universities. If we are to put forestry on a sound and permanent basis in Indiana, it must be done in a considerable degree by enlisting the assistance of the new generation. We appeal to men and women in every avenue of activity to give to the movement their heartiest assistance. With it we shall not fail to render service of lasting benefit to every neighborhood within the State. The press of Indiana, which is loyal to her interests, must be relied upon to aid in the work of educating the people as to the necessity of giving forestry more earnest consideration and aid in impressing upon their minds the fact that the work is of present importance.

We appeal to all public-spirited citizens for their co-operation. The measure of our success will depend upon them. Any one in good standing and in accord with its object may join the association by signing and forwarding to the Secretary at Indianapolis the following application for membership, accompanying the same with one dollar in cash or check:

To the Secretary of The Indiana Forestry Association, Indianapolis:

Feeling an interest in the subject of forestry in Indiana, and being in hearty accord with the purpose of The Indiana Forestry Association, I hereby request to be enrolled among its membership. I hand you one dollar in payment of dues until December 31, 1911, and agree to pay one dollar annual dues thereafter as provided by the by-laws.

(Signed)

P. O. Address.....

County

Indiana.

Date:19..

Every portion of the State should be fully represented in the association. We wish to reach every neighborhood. Each member will be kept advised of the progress of the work of the association.

This is essentially a matter of State concern—yet it is in the best sense of national moment; for as we conserve the interests of Indiana, we shall contribute to the strength of the entire country.

CHARLES W. FAIRBANKS,

President.

GEORGE B. LOCKWOOD,

Secretary.

The new association has strong support and seems to represent a real awakening of interest in this subject. In a recent meeting at Anderson, Professor Thomas, of Wabash College, said:

It is not the purpose of The Indiana Forestry Association to reforest the State or recommend even the covering of rich agricultural lands with trees. It is their purpose to urge the replanting of woodlands in large tracts wherever they occur, and in small tracts on a very large percentage of the farms of the State. A farm woodlot on every farm will be one of our movements.

Commenting upon this the *Indianapolis News* remarked:

That is well for a beginning—and well begun is half done. If we can get the old wooded tracts replanted—as Gifford Pinchot urged that they so much needed to be; arouse an interest that will make a wooded tract a feature of every farm, we shall do a work of inestimable magnitude. But we should say that as the work goes on it will spread. There is no reason why we should not have all city streets and the "better roads" of the State (which was also a subject of the association's solicitude), lined with trees. In short, attention once turned to the subject, the work will grow beneath the hand. There are practical questions of moisture—misunderstanding of which has been one of the causes that have brought about the denudation of the soil. The farmer begrudges the moisture that the trees draw and wants to save it for his crops by cutting the trees away. But if accepted theories are correct, he at once cuts away cause as well as effect, since more trees would hold as well as draw moisture.

But all this is a detail that the expert and learned opinion of the work will be able to settle. The practical thing now is to replant the wooded tracts and to draw popular attention to the whole subject; to spread popular knowledge; to make Arbor day a great day, a day of public celebration, so that tree planting shall become general.

The *News* further notes the systematic way in which the whole Belgian people once enlisted in reclothing the country with trees, making it a national festival, and says in conclusion, that of all the forms of conservation "none is of greater importance for Indiana than reforestation. It is a patriotic duty that every citizen owes this State to take an interest in it."

This fine spirit will surely accomplish results. The new association can be assured of the heartiest good wishes and support of the American Forestry Association.



Forest Fire Conferences

The Lake States have been thoroughly aroused by the fires of this past season and conferences to deal with the fire question

seem to be much in order. In addition to the Michigan meeting, which resulted in the formation of the Northern Fire Protective Association, which we have referred to elsewhere, a meeting was held at Bemidji, Minnesota, on the 11th of November, under the auspices of the Northern Minnesota Development Association, to frame a bill for the protection of the timber lands of Minnesota, this bill to be submitted to the Development Association at its meeting in Brainerd, December 2nd.

Broader in scope than either of these, however, is the Lake States Forest Fire Conference which is to be held in St. Paul, December 6th and 7th. At this conference the Governors of the three States are to speak. Governor Eberhart of Minnesota, is to speak on the State's duty in preservation of its forests; Governor Warner of Michigan, on Michigan's forestry policy, and Governor Davidson of Wisconsin, on what the forests mean to its people. The program of this meeting has been shaped by the Minnesota Forestry Association and the discussion will be broad and thorough. National and State forest officials and timber land owners will be present and it is believed that much good will result from the gathering.



A Generous Forest Gift

Joseph Battell, of Middlebury, Vermont, has offered to Middlebury College ten thousand acres of wild land in the towns of Hancock, Goshen and Ripton to be used for a school of forestry. He believes that with such a demonstration forest close at hand Middlebury would be in a position to do good work for higher education in forestry.

Mr. Battell has already given to the public a large tract for a park and has offered the United States Government a tract on Lincoln Mountain in Warren, 4,000 feet above sea, worth \$100,000, if the Government will spend as much improving it. He believes New England, which shares but little, and Vermont especially, which shares hardly at all, in the money expended by the Government for public improvements should have a government reservation, so he offers this splendid tract of land, attaching to the gift no conditions except that the Government shall expend \$100,000 on the property when acquired.

Mr. Battell is the largest individual landowner in Vermont. It was through his interest, generosity, and faith in the Morgan horse that the Government breeding station was established in Weybridge, Vermont. He is a gentleman of active and efficient public spirit.

EDUCATION

Forestry Essays in the Schools

One of the most promising things for the future of forestry in this country is the growth of the movement to instill its principles and interest in it into the minds of young people. After all, when the reformers of today have done and said everything that they can, the future lies with the rising generation more than with that which now handles the controls. In Indiana the State Board of Forestry offers prizes for essays on forestry by pupils of the schools of the State. The same thing has been done elsewhere. But this is not the best part of it. The really heartening fact is that the children themselves are easily aroused to an enthusiastic and intelligent interest, if they are approached in the right way.

As an example of this thoughtful interest the accompanying paper, by a girl of fourteen in the public school of Fessenden, North Dakota, is worth reading. It is also worth while to consider the value of leading hundreds of thousands of those young people who will have the grave economic problems of the future to wrestle with to thinking along these lines.

WHY PLANT TREES?

By Esther Macdonald

The question of "Why Plant Trees" is a great topic of discussion throughout our nation. Many men versed in forestry have been employed in the conservation of the forests. There are numerous reasons for planting trees and for preserving them after they are planted.

It would be a very dull nation indeed that had no forests. Animal life as well as the nation in general is largely dependent upon forests. The forest is the home of the bear and many fur-bearing animals. The furs of these animals bring the United States many thousands of dollars each year. The forest is also the home of the deer and the huntsman would not have the pleasure of hunting this animal if there were no forests. Beside the animals living in the forests there are many fish which live in the fresh-water streams, many times the result of forests. The fish are worth great sums of money and I think that every person who enjoys fish would regret very much to see them destroyed.

Everyone needs a house to shelter him and this he would not have but for the forests. We employ many men and women to work in the field harvesting grain, to work in the

factories making articles to use in our own country and to export to other countries, but the question arises, "How are we going to get them over to the other countries?" We must have something to carry them over in; they will not float like Ivory Soap. The answer quickly comes, "Why, vessels, of course." But where would we get the many wonderful vessels that we possess if some trees did not forfeit their lives to furnish the lumber for them. Many forests are denuded for the purpose of furnishing poles for various telephone and telegraph lines, and while this may seem a deplorable fact, it is a commercial necessity. The pencils and paper which we use in our schools are derived from trees.

Did you ever stop to think that forests are a source of health? When the pure air is taken into the body it becomes gaseous or impure and when breathed out is called carbon dioxide. The forests breathe in the carbon dioxide which we breathe out and in return breathe out fresh air or oxygen.

The forests have a great deal to do with the climate of any country. They serve as wind-breaks and in summer when the weather is exceedingly warm, what is more pleasant than to crawl away from the outside world with an interesting book and spend the hottest hours of the day in some shady nook well surrounded by trees?

The soil of the forest is very porous or sponge-like. It absorbs the moisture and gives it up as it is needed. The origin of many large rivers is from the forests. First we see a bubbling, sparkling spring formed in some wood and perhaps many miles away that little spring has created a large river. Thus our water supply is largely dependent upon forests.

In the earth are many minerals which, when the water flows through them, purify the water and make it fit for drinking purposes.

The buzz of many factories would be forever hushed if forests were abolished. Many of the things which we wear are made in factories whose machinery is run by water. The number of factories in our country would be greatly decreased if there were no forests. As it takes water to carry a vessel we need many rivers to transport our goods from place to place. Water transportation is much cheaper than railroad.

The United States uses much more lumber than the forests produce, in fact they use three and one-half times as much. We are sorry to say that the countries of Europe have conserved their forests more than we,

the citizens of the United States, have. Some of the foreign countries have only enough lumber for home consumption while some have not enough and must import. Why should the United States produce so little lumber? It has plenty of land and excellent soil for growing trees. It is because the people of the United States have been constantly destroying what in former days were large forests. It will take several years to replace these forests. Many people who plant trees will possibly meet with failure because of their ignorance of how to do it, but after they have studied out their mistake let them replace the trees that failed and they will probably meet with better success the second time.

We are surprised to learn that of all the forests of the United States four-fifths are owned privately. The owners of these forests ought also to comply with the laws governing United States forests. Owners should see that all decayed and dead branches are removed as they obstruct the growth of the young trees. The trees should not be cut down until they are of a certain age because the lumber is not very good and this would be very wasteful indeed.

Many forests have been ruined by fire. Extreme care should be taken on the part of every person to prevent these fires. Sometimes picnic parties select a wooded place as their picnic grounds, build little fires to cook some of their food and after they have finished their merry-making and departed to their homes one might see a wavering line of blue smoke arising from the place where the picnickers had built their little fire. If there happen to be any dry twigs or branches near this fire it will not be long before one might see little tongues of flame reaching out to grasp all within their reach and this is the way the fire spreads until after a while the whole forest is ablaze and the people who resided near-by would be seen running panic-stricken out of the way of the angry forest fire. Trees would be falling upon each other, one might hear branches and twigs snapping as the leaping, roaring fire takes them as its victim.

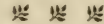
The New England States have been very successful in planting trees and so has Prussia. The United States has trees both in the eastern and western parts, but the middle northwest is very needy in this respect. Wherever there are trees the land is always worth more than where there are none, because the forests retain the moisture and soil. This soil is much better than the dry, hard, baked soil of the prairies. The soil of the prairies is good in itself, but might be bettered if there were more moisture. To get this there ought to be more forests.

Vegetation depends largely upon moisture and moisture depends largely upon forests.

As forests serve as wind-shields all North Dakota people should be very interested in planting trees, for the wind is exceedingly strong here at times. The wind dries up the moisture in any treeless country, but the moisture can be retained for a great length of time in a wooded country.

The parts of our country that are wooded are famous for their beauty, such as California, Wyoming, and other States. An unwooded country cannot be compared with a wooded country because the wooded country is far more beautiful and fascinating. It usually has better soil and more moisture than the unwooded. It is pleasanter to the eye, as it roves over the earth's surface, to see beautiful trees with occasional springs and streams here and there, than to see nothing but treeless plains as far as the eye can see.

The foregoing reasons are the most prominent for having forests and for preserving them. The State of North Dakota is a pleasant place to live in, but its lands might become more valuable and more pleasant to live upon if forests were planted and preserved.



The Indiana Prize Essays

To encourage the study of forestry among the pupils of the public schools the Indiana State Board of Forestry offers four prizes of \$10.00 each for the best essays on forestry. The contestants for the first prize are limited to the pupils of the seventh grade country schools. The second prize is for the pupils of the eighth grade country schools. The third prize is for the members of freshman and sophomore classes of the high schools of the State. The fourth prize is for the members of the junior and senior classes of the high schools. The conditions are as follows: The subject must be: "To what extent should Indiana be reforested; give reasons." The essay must be a handwritten manuscript in ink, containing not more than one thousand words. The essay must be in the hands of the Board on or before May 1st, 1911. Former prize essay winners are not eligible. The essays are to be graded on the basis of 70 points for thought, 30 points for composition, manuscript, etc. The Board wishes original thought and no credit will be given contestants who copy verbatim works on forestry. If direct quotations are used they should be indicated by quotation marks and their source given in a footnote.

STATISTICS

The Census Returns of Production from Forests

The present census will give fuller and more complete statistics of wood products than the country has ever had. Incidentally it may be remarked that these statistics will give striking confirmation at many points to the contentions of the advocates of conservative forestry as an economic necessity. The figures hitherto available have not had the advantage of the organization and close canvass of a general census, so that they have necessarily been incomplete and the blank spaces have had to be filled by estimates. This does not detract from their substantial correctness and their value in ascertaining general principles, but confirmation of conclusions and a means of checking results are sought through the collection of the fullest possible data.

The Census Bureau has issued preliminary comparative reports for the years 1907, 1908, and 1909, on the production of lumber, lath, and shingles, and on the wood-pulp and cross-tie industries. These reports have been in charge of J. E. Whelchel, expert special agent of the division of manufactures, and have been prepared in cooperation with the Forest Service. Through the same cooperative arrangement between the Forest Service and the Census Bureau annual statistics are published relating to the group of lumber and timber industries.

LUMBER

The lumber cut in the United States during the calendar year 1909 was 44,585 million feet, board measure, as against 33,224 million feet in 1908, and 40,256 million feet in 1907. This was an increase of 34.2 per cent. over 1908, and of 10.8 per cent. over 1907. The output of lath and shingles during 1909 was 3,712 million and 14,945 million, respectively. The increase in the production of lath in 1909 over 1908 was 24.3 per cent. and over 1907 1.3 per cent., while the corresponding increases for shingles were 23.4 per cent. and 26.4 per cent.

The relatively large increase in the number of mills reporting for 1909, together with the increase in the cut for that year, was largely due to the fact that the field force of the Census Bureau, which was engaged in gathering statistics of all branches of manufacture throughout the United States, secured returns from practically every sawmill in operation during the whole or any part of 1909, without regard to its size, and in this way there have been included many

small mills not covered by the mail census in the preceding years.

Yellow pine, including the several species, longleaf, shortleaf, loblolly, Cuban, etc., produced in the coast states from Virginia to Texas, and in Arkansas and Oklahoma, maintains a growing predominance in the total cut. The total output of these comprised 44.3 per cent of the total in 1907, 45.3 per cent. in 1908, and 49.5 per cent., or over twenty-two billion feet in 1909. The returns show nearly double the number of mills in the yellow pine states as compared with 1908, a result due probably to reaching the small mills in remote localities by means of the personal canvass of the general census.

The limited output of mills of this class and size, however, is almost without exception consumed in the immediate vicinity of its manufacture, and hence exerts little or no influence on supply and prices in the general lumber market of the country.

The proportion of the total lumber cut by New England and New York declined from 9 per cent. in 1907 and 9.6 in 1908 to 7.5 in 1909, spruce and white pine still occupying the first place in this region. The Lake states also continue to decline in relative importance. They furnished 13.6 per cent. of the total cut in 1907, 13.2 in 1908, and 12.3 in 1909.

The output of the Pacific coast states was 28.3 per cent. larger than in 1908 and 2.2 per cent. larger than in 1907, but the proportion to the total was less than in either of the two preceding years, being 15.5 as against 16.2 in 1908, and 16.8 in 1907. Douglas fir is the leading timber tree in this region, being nearly four-fifths of the product of Oregon and Washington. Redwood forms nearly half of the production of California.

Of the total production of lumber in 1909, softwoods supplied 33,875 million feet, of 76 per cent., while hardwoods contributed 10,693 million feet, or 24 per cent. Softwoods contributed 1 per cent. less of the total production in 1909 than in 1908 and 1907, in each of which years they formed 77 per cent. of the total.

The species which produced over three per cent. of the total cut in 1909 were yellow pine, which has a long lead, with 36.5 per cent.; Douglas fir, 10.9 per cent.; white pine, 8.8 per cent.; oak, 10 per cent.; hemlock, 6.8 per cent.; spruce, 3.9 per cent., and western pine, 3.4 per cent. The states contributing over one billion feet of the total production in 1909, in the order of produc-

tiveness, were: Washington, Louisiana, Mississippi, North Carolina, Arkansas, Virginia, Texas, Wisconsin, Oregon, Michigan, Alabama, Minnesota, Pennsylvania, West Virginia, Georgia, Tennessee, Florida, California, and Maine.

CROSS-TIES

In 1909 the total number of cross-ties reported as having been purchased, was 123,754,000, costing \$60,321,000 at the point of purchase, as compared with 112,463,000, costing \$56,281,000, in 1908, and 153,700,000, costing \$78,959,000, in 1907. The latter year does not, however, represent the true standard of comparison, as it was one of unusual railroad development. The decrease in 1908 was about 26.8 per cent., but in 1909 the balance swung back to 80.5 per cent. of the 1907 record, and was, as stated, an increase of about 10 per cent. over 1908. While there was considerable variation in the number of cross-ties purchased during the three years, the average cost per tie remained close to 50 cents.

A significant feature is the fact that in 1909 there were 16,437,000 cross-ties reported as purchased for new track, as against 7,431,000 in 1908, and 23,557,000 in 1907.

The purchases by steam railroads formed about 93 per cent. of the total in 1909 as compared with approximately 94 per cent. in both 1908 and 1907.

The principal kinds of wood used in the manufacture of cross-ties in the ranking order in 1909, are: Oaks, southern pines, Douglas fir, western pine, cedar, chestnut, cypress, tamarack, hemlock, redwood, white pine, lodgepole pine, gum, spruce, and beech, and the remaining varieties are grouped together in an "all other" class.

WOOD PULP

There were 253 wood-pulp mills in operation during the whole or part of the calendar year 1909 in the United States, as against 251 in 1908. The consumption of pulp wood in these mills during 1909 was 4,002,000 cords, as against 3,347,000 cords in 1908, an increase of about 19 per cent. Since 1907 there has been a decided decrease in

the consumption of the best known and highest priced pulp wood, namely, spruce, this species contributing 68.1 per cent. of the total in 1907, 64.5 per cent. in 1908, and 60.5 per cent. in 1909. There has also been a slight decrease in hemlock, whereas corresponding increases have occurred in the consumption of woods heretofore little used as pulp material, such as balsam, white fir, and several hardwoods, including birch, beech, maple, gum, and basswood. This increase is especially marked in the case of balsam, the quantity of this species consumed in 1909 being more than double that reported for 1908.

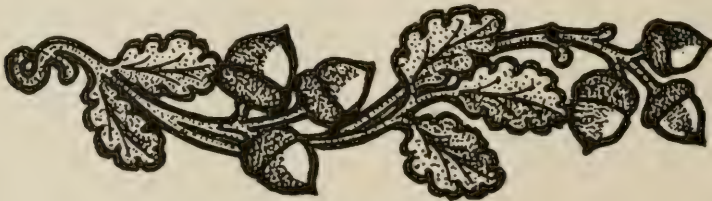
The steady decrease in the annual consumption of spruce has been accompanied by a substantial increase in the average cost per cord of this species. As indicated by the figures, this was \$8.90 in 1907, \$9.33 in 1908, and \$9.96 in 1909.

The tendency to use the woods less highly considered in pulp making becomes more marked as the cost of spruce increases and the available supply is reduced. White fir, which is separately shown for the first time in 1909, is one of the woods of good quality for pulp which has been utilized only during recent years. It is very common in the national forests, and at present has a rather low value, due both to the lack of knowledge of its pulp value and to the lack of other uses for it. The development of the use of this wood for pulp will mean much for the national forests' management, for it will make it possible to dispose of much material for which there has hitherto been little demand.

The advancing cost of pulp wood of all species is clearly brought out in the report. The total consumption in 1909, though exceeding that of 1907 by less than 40,000 cords, cost over \$2,000,000 more.

The quantity of slabs and other mill waste consumed as pulp material was substantially the same in 1909 and in 1908, about 250,000 cords in each year, which, however, was a material increase in the consumption of this character of material over 1907 when 193,000 cords of it were reported as used.

The reported total production of air-dry pulp in 1909 was 2,491,406 tons, as against 2,118,947 tons in 1908 and 2,547,879 tons in 1907.



NEWS AND NOTES

TO PROTECT LONG ISLAND

Bringing a Railroad to Obey the Fire Law of New York

Some of the public-spirited residents on Long Island, New York, have for two or three years been endeavoring to secure the Island against the forest fires that so seriously menace all wooded property. Long Island is peculiarly liable to visitation by fire because it is traversed by three lines of railway, in its fifteen miles of width, one through the middle of the Island, one on the north and one on the south shore, while its width is swept by strong sea breezes from both the north and the south. As a result of the efforts of a number of residents, the leader of whom is Charles M. Higgins of Brooklyn, who has a summer residence at Smithtown, two suits against the Long Island Railroad Company, have been fought and won. The story is told in a pamphlet report by Mr. Higgins to his neighbors and fellow land-owners.

The first case was brought by the Forest, Fish and Game Commission of New York, in response to a petition signed by sixty land-owners of Smithtown and the adjacent country, among them being Judge (now Mayor) Gaynor and former Forest Commissioner Edward Thonipson. In his report Mr. Higgins says:

As the result of our petition to the Forest, Fish and Game Commission of the State, as you are aware, one suit was brought by the State of New York in July, 1907, for over \$100,000 in penalties incurred by the railroad company for its flagrant failure for many years past to observe the forest laws of the State for the prevention of fires through forest lands along its right of way.

Another suit had been previously brought by myself personally for damages suffered by a destructive fire caused by the railroad company in my woodlands on April 19, 1906, when over thirty acres of forest were destroyed. * * *

One of the most important points in the forest laws of the State on which suit was brought was the clause requiring railroads to cut and remove at least twice a year all grass, brush or other inflammable material along its right of way through forest lands or lands subject to fire from any cause—a law which we all know has been utterly disregarded for years by the railroad company. The answer of the railroad company to this suit was a demurrer, denying that the Forest Commission had any jurisdiction in this county, and that the law applied only to State reser-

vations or public forests or parks, and in no sense to private woodlands. This question was carried through every court by appeal up to the Court of Appeals, and in each court this law was sustained and the railroad company defeated, it being now the fixed law of this State, as defined by the Court of Appeals, that all railroad companies must clear their right of way at least twice a year of all grass, brush or combustible material along forest lands or lands subject to fire, whether these lands are public or private, under a penalty of \$100 a day for its neglect to do so. The law being now settled by our highest State court, this suit by the Forest Commission will now be tried on the facts and merits at the next session of our Suffolk County Court for the collection of said penalties.

In addition to this decision of the higher courts enforcing this specific forest law, the lower courts, in my own personal suit, have decided in two decisions, first by Judge Crane and then by Judge Jaycox, that the railroad company is bound by common law, even without specific statute law, to keep its right of way properly cleared of all combustible matter and where it fails to do this, and a fire results therefrom and passes to adjacent land, the railroad company is guilty of negligence and liable for damages, and my personal suit was won mainly on that point, which is a new and most valuable legal point now settled against the railroad companies, both as statutory and common law in this State.

Mr. Higgins then proceeds to point out the substantial gain which the decisions in these cases represent, and that whereas hitherto prosecution has been too expensive a luxury for the individual landholder to indulge in, because of the difficulty of making a case, now "legal conditions are quite radically changed all along the line to the advantage of the public by the victories won in these two suits, and also by the new laws passed by the last Legislature, which now promise to make it more expensive for the railroads to neglect proper precautions and defy public right and safety than to keep their engines and right of way in such condition as will prevent bad forest fires in the future."

In the suit of the Forest Commission against the railroad a verdict for \$32,500 was given to the State against the Long Island Railroad Company. A motion made by the railroad to set aside this verdict, on technical points, had not been decided when this article was written, but it was expected

that it would be denied and that the railroad company would fight the case up to the court of last resort.



Northern Forest Protective Association

At a meeting of prominent Michigan timber land owners in Marquette, November 5, the Northern Forest Protective Association was organized. This association has for its object, as stated in the article of incorporation, "The preservation of the forests of the States of Michigan and Wisconsin generally and particularly from loss by forest fires, and the enlistment of the aid of the United States of America and the States of Michigan and Wisconsin in preserving said forests and preventing their destruction by fire, and all other objects which will promote the main objects as herein set out or incident thereto."

The chairman of the meeting was Thornton A. Green, of the Greenwood Lumber Company of Ontonagon, and the secretary, W. C. Howe, of the American Lumbermen. The meeting was addressed by J. C. Sherman, of Marquette; Thomas B. Wyman, for-ester of the Cleveland Cliffs Iron Company; A. E. Miller, attorney for the J. C. Ayer estate, of Marquette; R. S. Kellogg, of Wausau, Wisconsin, secretary of the Northern Hemlock and Hardwood Manufacturers' Association; C. H. Worcester, of Chicago, of the Worcester Lumber Company; F. H. Smith, of Traverse City; A. F. Koipcke, of Marquette, of the Peter White Land Company, and H. R. Harris, of Marquette, of the Munising railway. The following officers were elected: President, T. A. Green, Ontonagon, Michigan; vice-president, C. V. R. Townsend, Negaunee, Mich.; secretary, T. B. Wyman, Munising, Mich.; treasurer, J. C. Sherman, Marquette, Mich.; directors, C. H. Worcester, Chicago, Ill.; G. A. Goodman, Marinette, Wis.; W. H. Johnson, Ishpeming, Mich.

In accordance with the method of similar associations, the expenses are to be defrayed by assessments levied by the directors upon the total acreage of timber lands of the members.

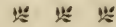


Insurance Against Loss by Forest Fires

A recent news item from Canada records the insurance by Lloyds, of London, of six thousand square miles of timber lands against loss by forest fires. This, the first insurance of the kind ever effected on this continent, so far as we know, has been taken out by one of the largest timber land owners

in the province of Quebec, Price Bros. & Co., Ltd., of the city of Quebec. This new form of insurance was brought to the attention of financial circles in Montreal and Toronto recently when Price Bros. announced the issue of \$5,000,000 of five per cent bonds on their properties. The issue is to cover the expansion of their lumber business into a paper making company, with a 150 ton newspaper mill now being built by Jonquieres, Que., in the Lake St. John region, where they are developing 15,000 horse-power. The insurance of their enormous holdings of timber lands against fire is intended as additional security to the bondholders. It covers a term of thirty years.

Insurance of timber lands against loss by fire has been regarded as impossible except at prohibitive rates. It has remained for the redoubtable and untterrified Lloyds to prove the contrary. Timber land owners will be interested to know the terms on which this insurance was placed.



The Taxless Town

There is a little town in Sweden by the name of Orson. Orson. And Orson is one of the greatest towns in the world.

Of course Orson isn't as BIG as London, or New York, or Bagdad, or perhaps Oshkosh. But Orson has done something that none of the so-called "great" cities of the world has ever done.

Orson has dodged all local taxes—successfully and honestly.

The Orson railway is free to every citizen of the town.

The telephone service is free.

Schools and libraries cost the citizens absolutely nothing.

All because, a generation or two ago, the patriotic people of Orson planted trees. Orson has a municipal forest that has yielded the town \$5,000,000 in the past thirty years.

And the \$5,000,000 has paid the running expenses of the town.

Of course there isn't anything to hinder any American town from doing the same thing. But we don't notice any American town doing it. To date Milwaukee seems to be the only American town that has even thought about it.

But it's worth thinking about, isn't it?

Also it might be worth while to consider at the same time the fact that while Orson was paying her municipal expenses for the past year from the proceeds of her well-kept forest, the American nation, through neglect of her forests, was suffering a loss of two hundred million dollars and more than a hundred lives.—*Boston Traveler*.

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